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BULLETIN
No. 65

Home Economics Series
No. 5

CHILD CARE AND CHILD WELFARE

OUTLINES FOR STUDY

Prepared by
The Children's Bureau
United States Department of Labor
in cooperation with
The Federal Board for Vocational Education

OCTOBER, 1921

Issued by the
FEDERAL BOARD FOR VOCATIONAL EDUCATION
Washington, D. C.

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FOREWORD.

From institutions that are offering courses for the training of vocational teachers of home economics there has been a very general demand for source material which could be used as the basis of instruction in child care and child welfare. This demand comes because of the emphasis that is now placed upon child care as an important part of the vocational training for home making.

The Federal Board for Vocational Education is charged with the duty of making studies, investigations, and reports which will be of assistance to the States in the establishment and conduct of vocational schools and classes. When deemed advisable, these studies and reports may be made in cooperation with or through other Government departments interested in similar lines of work.

One of the chief functions of the Children's Bureau of the Department of Labor is to make studies and investigations in the field of child care and child welfare. Through a cooperative arrangement between that bureau and the Federal Board for Vocational Education this bulletin has been prepared.

The bulletin deals with the important phases of childhood and is published with the hope that it may serve to stimulate the right kind of instruction in child care as a part of the training for vocational teachers of home economics.

These outlines are not prepared for use directly as lessons. They are not in lesson form, but are published as source material from which the instructor may make her own course.

Many of these outlines will be found to overlap, and it may be that certain subjects are not presented, or at least not given sufficient emphasis. Occasionally slight differences of opinion will be found to exist, for authorities are in disagreement on some of the important points discussed.

Both the Children's Bureau and the Federal Board will welcome frank criticism and constructive suggestions which may lead to an improvement of the teaching of this subject, both in the colleges and in vocational schools of less than college grade.

The preparation of this material has been undertaken by the Children's Bureau of the Department of Labor, under the direction of Dorothy Reed Mendenhall, M. D., assisted by Miss Mercy Beardsley Hooker.

Miss Julia C. Lathrop, Chief of the Children's Bureau, in submitting this material, makes the following statement of authorship and acknowledgments:

"In detail, the outlines were prepared by the following persons—

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Section II: The Development, General Hygiene, and Feeding of the Child, Outline 1, Theodora Wheeler, M. D., formerly of the Children's Bureau; Outlines 2, 3, 4, 5, Dr. Mendenhall; Outline 6, Ruth Wheeler, Ph. D., Goucher College; and Outline 7, Mabel Simis Ulrich, M. D., supervisor of social hygiene education, Minnesota State Board of Health, and director of health service, northern division, American Red Cross.

Section III: Problems Related to Safeguarding the Health of the Child, Outlines 1 and 2, Dr. Theodora Wheeler; Outlines 3 and 4, Ella Oppenheimer, M. D., Children's Bureau; Outline 5, Dr. Theodora Wheeler and Dr. Mendenhall; Outline 6, Miss Nettie McGill, Assistant Director, Industrial Division, Children's Bureau, and Miss Mercy B. Hooker; and Outline 7, Miss Mina Sessions, formerly of the Children's Bureau.

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Lewis H. Carris,
Administrative Head.

CHILD CARE AND CHILD WELFARE.

INTRODUCTION.

Children are a nation's most valuable asset, for on their inherent possibilities and their development the future of the State depends. Although the responsibility for the welfare of the child rests ultimately with organized society, or the community, this responsibility has only comparatively recently been recognized in the United States. Investigations have brought to light the fact that a great number of our children are dying needlessly, and that other large groups are subjected to preventable disease and to various conditions injurious to mental and moral progress. A recognition of this has been the basis in recent years for constructive legislation and public and private effort to remedy these conditions. The World War, moreover, revealed evils which have brought about further measures on the part of Federal, State, and local agencies to care for the child population.

I. FUNDAMENTAL RIGHTS OF CHILDHOOD.

Every child has certain fundamental rights. These include:

A. The best possible heredity.

B. Basic requirements for health, both physical and mental.
   1. Breast feeding if possible; otherwise feeding under direction of physician.
   2. Proper and sufficient food.
   3. Correct hygienic care and training.
   4. Protection from communicable diseases.
   5. Treatment of remediable defects.

C. Normal home life.
   1. Sufficient income for the needs of the family.
   2. Decent, clean home, not overcrowded.
   3. Parents with an appreciation of their duties, making an effort to fulfill them.

D. Education.
   1. Schooling at least nine months a year, either full or part time, up to 18 years of age.

E. Opportunity for play and companionship.

F. Protection from child labor.

G. Moral and religious training.

II. THE HOME AND THE CHILD.

A. Family life is the highest and finest product of civilization.
   1. The family has developed as a result of the need of the child for long-continued care and protection.
   2. Family life is the medium through which the development of the child naturally takes place.
   3. The early years of a child's life, which are recognized as of great importance from the point of health, education, and training, are the years when the child is most completely under the influence of the home.
   4. The stability and progress of a nation depend on the character of the homes in which its children are reared.

B. Protection of the home is necessary.
   1. By the parents.
   2. By the community.
   3. By National, State, and local legislation.

C. Conditions menacing the stability of the home are:
   1. Divorce, separation, and desertion.
   2. Delinquency, drunkenness, and immorality.
   3. Poverty and shiftlessness.
   4. Unemployment and low wages.
   5. Mental defect and insanity.
   6. Sickness and death.

III. THE PARENTS AND THE CHILD.

A. Parents owe their child—
   1. Good heredity, mental and physical health.
   2. Happy, wholesome environment.
   3. Best care and training of which they are capable.
   4. Sympathetic understanding and love.
   5. Good example.
   6. Fullest possible preparation for life.
   7. An opportunity for proper companionship.

B. Parenthood is a profession, and as such demands training.

IV. THE STATE AND THE CHILD.

The duty of society to the child includes:

A. The establishment of minimum standards for child welfare.

B. The establishment of means for maintaining these standards.

V. NATIONAL AGENCIES WORKING FOR THE WELFARE OF THE CHILD.

A. Federal agencies.

1. Children's Bureau, United States Department of Labor.
2. Bureau of Education, United States Department of the Interior.
3. Public Health Service, United States Treasury Department.
4. States Relations Service, United States Department of Agriculture.
5. United States Federal Board for Vocational Education.
6. Office of Internal Revenue, United States Treasury Department. (Enforcing Child Labor Tax Law.)

B. Agencies financed by private funds.

Some representative agencies are as follows:

1. American Child Hygiene Association, 1211 Cathedral Street, Baltimore, Md.
2. American Red Cross, Washington, D. C.
3. American Social Hygiene Association, 105 West Fortieth Street, New York, N. Y.
4. Child Health Organization of America, 156 Fifth Avenue, New York, N. Y.
5. Child Welfare League of America, 130 East Twenty-second Street, New York, N. Y.
6. National Child Labor Committee, 105 East Twenty-second Street, New York, N. Y.
7. National Child Welfare Association, 70 Fifth Avenue, New York, N. Y.
8. National Committee for Mental Hygiene, 50 Union Square, New York, N. Y.
9. National Committee for the Prevention of Blindness, 130 East Twenty-second Street, New York, N. Y.
10. National Congress of Mothers and Parent-Teacher Association, 1201 Sixteenth Street NW., Washington, D. C.
11. National Organization for Public Health Nursing, 156 Fifth Avenue, New York, N. Y.
12. National Probation Association, 370 Seventh Avenue, New York, N. Y.
13. National Tuberculosis Association, 381 Fourth Avenue, New York, N. Y.
14. Playground and Recreation Association of America, 1 Madison Avenue, New York, N. Y.
15. Russell Sage Foundation, 130 East Twenty-second Street, New York, N. Y.

VI. STATE AGENCIES WORKING FOR THE WELFARE OF THE CHILD.

A. State boards of health and bureaus of child hygiene.
B. State boards of charities and correction and child-welfare divisions.
C. State departments of education.
D. State departments of labor.
E. State institutions for dependent, delinquent, and physically or mentally handicapped children.
F. State child welfare or children's code commissions, and other special boards.

VII. LOCAL AGENCIES WORKING FOR THE WELFARE OF THE CHILD.

A. City and county: Departments of health, divisions of child hygiene, departments of charities, children's institutions, juvenile courts, departments of education, recreation, etc.
B. Private: Child hygiene associations, health centers, visiting nurse associations, day nurseries, associated charities, children's aid and protective societies, children's institutions, etc.

READING REFERENCES.

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Bosanquet, Helen: The Family, Macmillan & Co., London, 1915, pp. 260–314.

Byington, Margaret F.: The Normal Family, The Annals of the American Academy of Social Science, May, 1918, pp. 13–27.

Chamberlain, A. F.: The Child, Charles Scribner's Sons, New York, 1914, pp. 1–9.

Goodsell, Willystine: A History of the Family as a Social and Educational Institution, The Macmillan Co., New York, 1915, pp. 457–477.

Guyer, M. F.: Being Well-Born, Bobbs-Merrill Co., Indianapolis, 1916, pp. 159–194.

Kelley, Florence: Modern Industry, Longmans, Green & Co., New York, 1914, pp. 3–37.

Mangold, George B.: Problems of Child Welfare, The Macmillan Co., New York, 1914.

Minimum Standards for Child Welfare, U. S. Children's Bureau, Publication No. 62, 1919.

Oppenheim, Nathan: The Development of the Child, The Macmillan Co., New York, 1902, pp. 266–292.

Standards of Child Welfare, U. S. Children's Bureau, Publication No. 60, 1919.

Tufts, James Hayden, *and* Crothers, Samuel McCord: The Family, Russell Sage Foundation, 130 East Twenty-second Street, New York, 1915.

SECTION I. — HEALTH PROBLEMS OF MOTHER AND INFANT.

OUTLINE 1. BIRTH REGISTRATION AND INFANT MORTALITY.

The registration of an infant's birth, whether it is born alive or stillborn, is necessary before accurate vital statistics can be secured and before an intelligent basis can be laid for public health work, especially for the reduction of infant and maternal mortality. Furthermore, child-labor laws can not be enforced without irrefutable proof of age. The drafting of thousands of men for military service emphasized the need for more complete birth registration. Young men have been confronted with the necessity of furnishing proof of their age and citizenship, and have found such data lacking on account of faulty laws or imperfect enforcement of laws. The United States is now awake to the need of what many other civilized countries have long had—complete birth registration.

I. REGISTRATION AREA FOR BIRTHS.

A. In 1915 the birth registration area of the United States was established by the United States Bureau of the Census. For inclusion of a State in this area the Census Bureau must be satisfied that at least 90 per cent of the total number of births are registered.

The birth registration area in 1915 comprised 31 per cent of the total estimated population; in 1916, 32 per cent; in 1917, 53 per cent; in 1918, 53 per cent; in 1919, 59 per cent; and in 1920, 60 per cent.

In 1915 the birth registration area comprised 10 States and the District of Columbia. The States were Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont. In 1916 Maryland was added; in 1917, Indiana, Kansas, Kentucky, North Carolina, Ohio, Utah, Virginia, Washington, and Wisconsin were added; in 1918, no States were added; in 1919, California, Oregon, and South Carolina were added and Rhode Island was dropped; in 1920, Nebraska was added; in the first six months of 1921, New Jersey was added and Rhode Island replaced.

READING REFERENCE I.

Birth Statistics, U. S. Bureau of the Census, 1915, 1916, 1917, 1918, and 1919.

II. BIRTH REGISTRATION LAWS.

A. There is no longer any State without some law requiring the registration of births (see State laws).

B. In certain States, however, these laws are inadequate.

C. In many States existing laws are inadequately enforced, especially in rural communities.

D. A model law should require the baby's birth to be reported to the local registrar of the district by one of the following:

1. Doctor, nurse, or midwife.
2. Father or mother.
3. Householder or owner of premises.
4. Manager or superintendent of institution where child is born.

E. A birth should be reported within 10 days of the event, but if registration has been neglected at that time a record of the birth may be filed and recorded at any later date.

F. A standard certificate of birth has been adopted by the United States Bureau of the Census. When filled in, this certificate is sent to the State registrar of vital statistics. In the New England States a copy of the original certificate is sent to the State registrar, the original being kept by the local registrar.

G. An investigation of the different State laws should be made as to the following provisions:

1. Who is responsible for notification of birth?
2. How long a period may elapse between birth and notification?
3. What provisions have been made for enforcement?
   (1) Penalties.
   (2) Inducements, such as fee.
4. What local officer enforces the law?
5. What local officer serves as registrar of vital statistics?
6. What State officer serves as registrar of vital statistics?
7. Whether the law requires registration of stillbirths and what constitutes a stillbirth.

READING REFERENCES II.

Guilfoy, Wm. H.: The Enforcement of Registration of Births and Deaths in Metropolitan Areas—History, Methods, Results and Checks, Department of Health of the City of New York, August, 1917, reprint series No. 61.

Legal Importance of Registration of Births and Deaths, U. S. Bureau of the Census, 1908.

Registration of Births and Deaths, Drafts of Laws and Forms of Certificates, U. S. Bureau of the Census, Census Pamphlet No. 104, 1903.

The Federal Registration Service of the United States: Its Development, Problems, and Defects, U. S. Bureau of the Census, 1916.

Why Should Births and Deaths be Registered: A Summary of the History and Present Condition of Vital Statistics Laws, Including the Text of the Model Bill, American Medical Association, 535 North Dearborn Street, Chicago.

III. REGISTRATION AREA FOR DEATHS.

A. Since 1900 the mortality statistics, as published by the United States Bureau of the Census, have been confined to the group of States with 90 per cent efficiency of death registration, an area containing in 1900 40.5 per cent, and in 1910, 58.3 per cent of the total population of the United States.

B. In 1915 this area included 25 States (municipalities only of 1,000 population or over in North Carolina; whole State was included in 1916), the District of Columbia, and 41 cities in nonregistration States, or 67.1 per cent of the total estimated population.

C. In 1916 the area included 26 States, the District of Columbia, and 35 cities in nonregistration States, or 70.2 per cent of the total estimated population.

D. In 1917 the area included 27 States, the District of Columbia, Territory of Hawaii, and 43 cities in nonregistration States, or 72.7 per cent of the total estimated population.

E. In 1918 the area included 30 States, the District of Columbia, Territory of Hawaii, and 27 cities in nonregistration States, or 77.8 per cent of the total estimated population.

F. In 1919 the area included 33 States, the District of Columbia, Territory of Hawaii and 18 cities in nonregistration States, or 81.1 per cent of the total estimated population.

READING REFERENCE III.

Mortality Statistics, U. S. Bureau of the Census, 1915, pp. 9–10; 1916, pp. 9–10; 1917, pp. 10–11; 1918, pp. 10–11; 1919, pp. 9–10.

IV. COMPLETE AND ACCURATE REGISTRATION OF VITAL STATISTICS IS IMPORTANT AS A BASIS.

A. For legal records for court purposes, such as the protection of the rights of persons.

B. For sanitary records of the prevalence of disease to furnish data for all public health work.

C. For knowledge of the character and movement of the population essential for study of the growth of the United States and for enlightened legislation.

V. IMPORTANCE OF BIRTH REGISTRATION.

A. For the individual to establish age, parentage, personal identity, citizenship, rights to inheritance, or pension.

B. For the State to enforce laws regulating school attendance, child labor, and the age of consent, and to have accurate knowledge of the numbers of citizens of varying ages.

C. For the health authorities to study the problems connected with infant and maternal mortality, to offer medical and nursing aid in families of the newborn needing such assistance, and to prevent by prompt medical attention ophthalmia of the newborn.

READING REFERENCES IV AND V.

Birth and Death Bookkeeping, Association of Life Insurance Presidents, 1 Madison Avenue, New York.

Trask, John W.: Vital Statistics, U. S. Public Health Service, Supplement No. 12, 1914, pp. 25–26.

Why Should Births and Deaths be Registered, cited above.

VI. BIRTH REGISTRATION TEST.

A. A community test of the efficiency of birth registration is of value.

1. It is an excellent means of educating the public to the need of better registration, as well as a demonstration of how far the locality in question is short of attaining the standard of 90 per cent efficiency.
2. It usually leads to some form of infant welfare work.

B. A house-to-house canvass by a committee properly trained in taking data is the best way of getting a complete return. (For a model card for a birth registration canvass see An Outline for a Birth Registration Test, p. 7.)

C. Further information of interest to the special committee, such as the character of the child's feeding, can be added at the discretion of the committee, but the card should not be overcrowded.

D. The effectiveness of such a test depends largely on the way its findings are presented to the public. It is in reality pure propaganda, and to be of value it should be given wide publicity and should result in permanent follow-up work in the community.

READING REFERENCES VI.

Birth Registration Test, U. S. Children's Bureau, 1916.

An Outline for a Birth Registration Test, U. S. Children's Bureau, Publication No. 54, 1919.

VII. SIGNIFICANT FACTS SHOWN BY STATISTICS (BIRTH REGISTRATION AREA) OF THE UNITED STATES.

A. Birth rate:

1. 1915, 24.9 per 1,000 population.
2. 1916, 24.8 per 1,000 population.
3. 1917, 24.6 per 1,000 population.
4. 1918, 24.4 per 1,000 population.
5. 1919, 22.3 per 1,000 population.

B. Death rate:
   1. 1915, 14 per 1,000 population.
   2. 1916, 14.7 per 1,000 population.
   3. 1917, 14.1 per 1,000 population.
   4. 1918, 18.2 per 1,000 population.
   5. 1919, 13 per 1,000 population.

C. Excess of birth rate over death rate:
   1. 1915, 10.9 per 1,000 population.
   2. 1916, 10.1 per 1,000 population.
   3. 1917, 10.5 per 1,000 population.
   4. 1918, 6.2 per 1,000 population.
   5. 1919, 9.3 per 1,000 population.

D. The average excess of the birth rate over the death rate would mean, if conditions were stationary and no migration took place, an annual increase of about 1 per cent in the population of this area. This would give a decennial increase of a little over 10 per cent, or about half the rate of increase (21 per cent) of the country as a whole between 1900 and 1910, and approximately two-thirds of the rate (14.9 per cent) for the decade 1910–1920.

E. The excess of births over deaths is most pronounced in those localities in which the proportion of foreign-born population is largest.

F. The birth rate for the white population in 1916 was 24.9 per 1,000 population; for the colored population, 22.8 per 1,000 population.

   In 1917 the birth rate for the white population was 24.5 per 1,000 population; for the colored population, 25.8 per 1,000 population. (The birth rates were not shown separately by color for 1918.)

G. The death rate for the white population in 1916 was 14.5 per 1,000 population; for the colored population, 24.4 per 1,000 population. In 1917 the death rate for the white population was 13.7 per 1,000 population; for the colored population, 22.5 per 1,000 population. (The death rates were not shown separately by color for 1918.)

H. The infant mortality rate (number of deaths of infants under 1 year of age per 1,000 born alive), for the birth registration area as a whole, in 1915 was 100; in 1916, 101; in 1917, 94; in 1918, 101; and in 1919, 87. Among the 22 States and the District of Columbia in the birth registration area in 1919, Oregon and Washington had the lowest infant mortality rate, 63; and South Carolina had the highest rate, 113.

READING REFERENCES VII.

Birth Statistics, 1915–1917, U. S. Bureau of the Census, 1917–1919.
Mortality Statistics, 1916–17, U. S. Bureau of the Census, 1918–19.

VIII. INFANT MORTALITY.

(See also Section I, Outline 2, Topic VII.)

A. It is "the most sensitive index of social welfare," as it is influenced by—
   1. Intelligence, health, and right living of fathers and mothers.
   2. Standards of wages and home conditions. (See Section III, Outlines 6 and 7.)
   3. Standards of morals and sanitation.
   4. Efficiency of physicians, nurses, health officers, and educators.

B. For the age at which death most frequently occurs, see Mortality Statistics, published annually by the United States Bureau of the Census.

   Infancy is the most hazardous period of life except extreme old age; the younger the infant the more easily is he influenced by unfavorable environment, lack of care, and bad feeding.
   1. The largest number of deaths in any single year occurs in the first year after birth: In 1919, over one-eighth of the total number of deaths.
   2. In 1919 over one-third of the deaths in the first year of life occurred during the first three weeks. Thus for every 24 babies born alive, 1 died before he reached the age of 1 month.
   3. In 1919 over one-fifth of all deaths were of children under 5 years of age.

C. The conditions which in infancy demand national consideration to ascertain and remove:
   1. Causes of death in infancy.
   2. Causes of impaired health and vitality in infancy.

D. Chief causes of death during the first year after birth.
   1. Conditions related to the health and care of the mother (prematurity, congenital debility, birth injuries, malformations, etc.). (See Section I, Outline 3, Topic VII, E.)
   2. Gastro-intestinal disorders. (See Section III, Outline 4, Topic IV.)
   3. Respiratory infections. (See Section III, Outline 4, Topic II.)
   4. Other infectious diseases. (See Section III, Outlines 3 and 4.)

E. Changes in infant mortality rates from different causes from 1915 to 1919 (unfortunately, rates for the birth-registration area are available only since 1915):

1. Diarrhea and enteritis decreased over one-fifth, 22.9 per cent.
2. Malformations and premature birth increased slightly, injuries at birth remained nearly constant, while congenital debility decreased over one-fourth, 27.4 per cent. The group of causes related to the conditions of the mother decreased 5.6 per cent.
3. Respiratory diseases decreased 12.7 per cent.
4. Inaccurate diagnoses are becoming less frequent, as shown in the decrease in the rate from convulsions, a mere symptom of disease. (See Table I.)

TABLE I.—*Decrease in rates of infant mortality from certain important causes, 1915–1919, in the birth registration area of 1915 (exclusive of Rhode Island).*

Cause of death.	Infant mortality rate.		Amount of decrease, 1915 to 1919.	Per cent of decrease, 1915 to 1919.
	1915	1919		
All causes	99.6	88.7	10.9	10.9
Conditions related to the mother	40.8	38.5	2.3	5.6
Malformations	6.4	6.9	+ .5	+ 7.8
Premature birth	18.5	18.9	+ .4	+ 2.2
Congenital debility	11.7	8.5	3.2	27.4
Injuries at birth	4.1	4.1		
Diarrhea and enteritis	23.1	17.8	5.3	22.9
Respiratory infections	16.6	14.5	2.1	12.7
Other known infectious diseases [1]	7.6	8.6	+1.0	+13.2
Convulsions	1.6	1.1	.5	31.3
All other causes	9.9	8.3	1.6	16.2

[1] The figures, exclusive of influenza, were: 1915, 7; and 1919, 5.5, a decrease of 1.5 points, or 21.4 per cent.

F. Prevention of infant mortality in the United States.

1. The decrease in the infant mortality rate from 99.6 in 1915 to 88.7 in 1919 in the original birth-registration area is due largely to the establishment of infant-welfare stations and the dissemination of information in regard to proper feeding and care of infants through Governmental and private agencies.
2. Much work is still needed:
   - (*a*) To increase breast feeding.
   - (*b*) To instruct mother in proper care and feeding of her own infant.
   - (*c*) To control the milk supply.
   - (*d*) To lessen the possibility of infectious disease.

F. Prevention of infant mortality in the United States—Continued.
3. More attention must be paid in the future to the underlying causes of infant mortality:
(a) Bad heredity. (See Section I, Outline 2, Topic II.)
(*b*) Poverty. (See Section III, Outline 6.)
(*c*) Ignorance in regard to, and lack of facilities for prenatal and natal care. (See Section I, Outline 3.)
4. Poverty, or insufficient family income, may be responsible for or correlated with:
(*a*) Overcrowded living conditions.
(*b*) Poor housing and sanitation.
(*c*) Deficient medical care and nursing.
(*d*) Gainful employment of mothers.
(*e*) Care of young children outside the home.
(*f*) Parental sickness or intemperance.
(*g*) Insufficient or poor food.

G. Prevention of infant mortality in foreign countries. (See Great Britain Local Government Board; Meigs, Infant Welfare Work in War Time; New Zealand Society for the Health of Women and Children; also Save the Youngest (Revised). (See Section III, Outline 7, Topic II.)
1. Before the World War.
(*a*) Vigorous measures toward the reduction of the number of deaths in infancy have been adopted in France, Germany, England, and in many other countries since 1900. New Zealand has shown perhaps the most striking result of such work, having in the period from 1905 to 1918 reduced the infant death rate from gastric and intestinal diseases to one-fifth of the rate at the beginning of the period, and its rate from respiratory diseases to less than one-half that at the beginning of the period. The total infant mortality rate in New Zealand in 1919 was 45, or only slightly over one-half that of the United States. In England and Wales, after a long series of years (1891–1900), during which there was no appreciable sustained improvement, a great decline in infant mortality has occurred in recent years (since 1901).
2. Since the World War.
(*a*) During the war, in the chief belligerent countries for which data are available, work for the protection of infancy and maternity was greatly increased.

G. Prevention of infant mortality in foreign countries—Continued.
   2. Since the World War—Continued.
      (*b*) The measures taken in England and Wales, and the results obtained there, are particularly valuable. (The infant mortality rate was reduced in 1916 to 91 per 1,000 births, and in 1919 to 89, the lowest for any year on record.)

H. Prerequisites for the study and prevention of infant mortality are:
   1. Complete registration of all births, including stillbirths.
   2. Accurate registration of the causes of death the first year after birth.

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OUTLINE 2. THE DEVELOPMENT OF THE FETUS AND THE PROBLEM OF HEREDITY.

An understanding of the way in which a new life begins and the fetus develops is necessary for an appreciation of the possibilities of injury during the nine months from conception to delivery. The importance of the health of the germ plasm, the bearer of heredity, and the effect of an environment suited to the best development of the inborn capacities of the child must be considered in the problem which heredity presents. The awakening of a new consciousness of parental responsibility toward "the right of rights, that of being well born," has resulted in measures in some States to control the transmission of inheritances detrimental to race betterment.

I. THE WAY LIFE BEGINS.

(See Section II, Outline I, Topic VII, A.)

A. Methods of reproduction in the living world.
   1. Asexual reproduction, in the lowest forms of life.
   2. Sexual reproduction, in most plants and animals, including man.

B. Sex organs of man.
   1. Female.
      (*a*) Ovaries (or reproductive glands).
      (*b*) Fallopian tubes (oviducts, or collecting ducts).
      (*c*) Uterus (womb, or receiving organ).
   2. Male.
      (*a*) Testes (or reproductive glands).
      (*b*) Spermatic ducts (or collecting ducts).
      (*c*) Penis (or ejaculatory organ).

C. Reproductive glands.
   1. The ovaries.
      (*a*) Structure and position. (See Cady, pp. 59–67; also De Lee, pp. 30–31.)

C. Reproductive glands—Continued.
1. The ovaries—Continued.
(*b*) Function.
(1) To produce egg cells (ova).
(2) To elaborate an internal secretion which is poured into the blood supply and is necessary for the well-being of the woman.
(3) To elaborate a product which, during pregnancy, controls the development of the internal lining of the uterus.
(*c*) The ovum, or female cell.
(1) Egg cells are preformed at birth and are estimated to be at least 100,000 in number.
(2) This number gradually decreases largely by degeneration until it reaches one-third the original number at puberty, and disappears at the menopause.
(3) There is a monthly development of one egg cell, inside a sheltering envelope, called the graafian follicle.
(4) The development of this female egg cell, the largest cell in the body, from one of the many eggs within the ovary consists in the increase of yolk material in the cell protoplasm, and in the maturation of the nucleus.
(5) Maturation consists in the cell casting off one-half of its nuclear material, so that it contains 12 of its original 24 chromosomes. (The chromosomes of the reproductive cells, which are the bearers of heredity, are structures composed of nuclear material derived from the various ancestors of the individual.)
(6) This reduction in the number of chromosomes of the egg cell is duplicated in the sperm cell, and is an arrangement by which the cell formed by the union of the male and female cells contains the same amount of ancestral material from each parent and at the same time contains only the same number of chromosomes (24) as the ordinary cell of the species.

C. Reproductive glands—Continued.

1. The ovaries—Continued.

(*c*) The ovum, or female cell—Continued.

(7) When the ovum is mature, the graafian follicle containing it ruptures, and the ovum, now about 1/125 of an inch in size, escapes through a minute opening, is taken up by the end of the Fallopian tube, and is carried toward the uterine cavity.

2. The spermatozoon, or male cell.

(*a*) Huge numbers of sperm cells are formed constantly by the male reproductive gland.

(*b*) The sperm cell differs in shape from the ordinary cell, since it is very small and consists of a minute head, containing the nucleus, and a long thin tail, by which locomotion is possible.

(*c*) The sperm cell undergoes maturation during its development, similar to that described for the egg cell. (See Topic I, C, 1, c, (5).)

(*d*) The sperm cells after maturation are carried through the spermatic duct and the ejaculatory duct.

(*e*) If sexual union takes place, the sperm cells are deposited at the mouth of uterus or very close to it.

(*f*) The sperm cell, indeed practically only the nucleus of the sperm cell, is the contribution of the male parent to the new organism and to pregnancy.

D. Fertilization.

1. It consists in the fusion of a single spermatozoon with an egg cell, the head containing the nucleus penetrating the egg cell, and the tail remaining outside. The nuclei of the two cells fuse together; the resulting nucleus contains 24 chromosomes—12 from the male and 12 from the female cell.

2. This probably takes place from 14 to 17 days after the onset of menstruation and not as formerly believed shortly before or after menstruation.

3. Fertilization probably takes place in the oviduct or fallopian tube, the sperm cells having made their way slowly through the uterus and into the oviduct or tube.

4. Sex is determined at the union of the nuclei of the two germinal cells and can not be influenced subsequently. (See Howell, pp. 1000–1001; also Guyer, pp. 57–60.)

E. Segmentation.

1. The new cell divides soon into two individual cells and the division is kept up, the cells clinging together, until a spherical mass of small cells, the so-called mulberry mass, scarcely larger than the original egg in size, is formed.
2. The segmenting egg is carried down the oviduct, by means of a current produced in it, and finds its way into the cavity of the uterus, about seven days after fertilization.

F. Implantation.

1. The segmenting egg is supposed to burrow its way (by peculiar digestive properties) through the surface of the lining membrane of the uterus; the tissue then comes together behind it, and it finally lies in the depths of the membrane, completely shut off from the uterine cavity.
2. The segmenting egg now consists of a minute sphere of cells, possessing a central cavity and a thin external membrane.
3. This external membrane pushes its way in all directions into the surrounding uterine tissues by means of projections (villi) from its surface, and with the decidua (thickened lining of the uterus) forms the future afterbirth, or placenta and membranes.
4. This implantation of the fertilized egg in the uterine membrane arrests further menstruation during pregnancy. Menstruation is, in reality, the casting off of the lining membrane of the uterus which had been thickened to receive a fertilized ovum, which never appeared. (See Section II, Outline 7, Topic I, E.)

G. The embryo.

1. A slight outgrowth into the cavity of the segmented egg appears about the third week after fertilization. (This is the first sign of the differentiation of the embryo.)
2. Development occurs very rapidly from this time on. The egg increases 10,000 times in size within four weeks after fertilization.
3. At this time, when the embryo is only about one-eighth of an inch in length, the rudiments of the parts of the future child are present, and the brain, eyes, heart, and the several extremities are distinguishable.
4. At 8 weeks, the ovum is the size of a lemon, and the decidua has become differentiated into a protective and a nutritive part, or placenta. The embryo or fetus, as it should now be called, is about 3 inches long, and lies

G. The embryo—Continued.

surrounded by amniotic fluid in the decidual sac; it is attached by the umbilical cord to the placental portion of the sac.

5. At 16 weeks the ovum is about as large as a man's two fists and presents, in miniature, the appearance of the child at term.
6. At 9 months, or term, the uterus resembles in size and shape a watermelon, and the child lies in it, usually head down, ready for delivery.

H. Mother's contribution to pregnancy.

1. The female egg cell consists of the nucleus bearing the maternal inheritance and the yolk material contained in the cell, which later nourishes the fertilized and segmented cell, before it can receive nourishment from the mother's blood.
2. The uterus or receiving organ.
   - (*a*) Nonpregnant structure.
     - (1) It measures about 3 inches by 1½ by 1.
     - (2) It weighs about 2 ounces.
     - (3) It consists of a relatively thick wall and a small triangular central cavity.
     - (4) The mucous membrane lining undergoes constant changes in connection with menstruation. (See Topic I, F, 4.)
   - (*b*) Pregnant structure.
     - (1) The muscular walls are enormously increased and thickened until it forms a powerful muscular sac, preparatory to taking part in the expulsion of the child.
     - (2) It weighs finally, when empty, about 2 pounds.
     - (3) The mucous membrane thickened and enormously more vascular than in the nonpregnant uterus, is penetrated in every direction by outgrowths (villi) from the outer surface of the egg, in order to fasten the fetus securely and to allow of maternal nourishment.
     - (4) In the region adjacent to the development of the placental portion of the fetal envelope there is an inter-

II. Mother's contribution to pregnancy—Continued.
2. The uterus or receiving organ—Continued.
(*b*) Pregnant structure—Continued.

change from the maternal blood spaces and the blood vessels of the fetus, so that the nutritive serum of the mother reaches the new organism, and the waste products of the fetus are carried off through the maternal blood vessels. (There is, however, no direct connection between the blood of the mother and that of the fetus, but the interchange takes place through the villus-wall by osmosis and the vital action of the cells themselves.)

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II. THE PROBLEM OF HEREDITY.

A. Heredity and eugenics.
1. The child inherits physical and mental characteristics of its ancestors through both parents. (See Topics I, C, 1, c, and D.)
2. A good heredity is the supreme gift of parents.
3. The possibility of regulating inheritance by a wise choice in marriage is a modern development of eugenics, the science of the improvement of the human race by better breeding.
4. The responsibility of the State in regard to the prevention of the propagation of the mentally incompetent is now recognized.

A. Heredity and eugenics—Continued.

5. In some States, a medical examination, to prove there is no venereal or other disease, is now prerequisite to marriage. This eugenic law is the first step toward race improvement, by breeding from sound stock.

B. Heredity and environment.

1. Inborn capacity is limited by inheritance; good hereditary tendencies are the result of good germ plasm.
2. Wise care, proper training, the formation of good habits, and a healthy environment afford good potentialities the best chance for development, and may control the worst possibilities of bad inheritances, or offset them by the development of other good inborn capacities. If the environment is faulty the organism is impaired.
3. The long period of infancy and childhood and the gradual development of the mind and body make the possibilities of environmental influence very considerable in man.
4. Environment works through:
   (*a*) Home training and surroundings.
   (*b*) Community life.
   (*c*) Education.

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OUTLINE 3. PRENATAL CARE AND THE PROTECTION OF MATERNITY.

The value of the hygienic care of the expectant mother and its effect on the life and health of her offspring are just beginning to be appreciated. The size and vitality and hence the chance of survival of the new-born child depend largely on the condition of the mother during pregnancy and the care she receives during confinement and the lying-in period. Childbirth is a normal physiologic process and should not be attended with any great risk, if it is properly safeguarded. If maternity is to be made safe for all women, and if our infant death rate is to be reduced to a minimum, universal protection of maternity and infancy as a means of reducing the present loss of life and vigor must be undertaken.

I. SIGNS OF PREGNANCY.

A. Positive.
   1. Fetal movement or quickening, from the sixteenth to the twentieth week of pregnancy.
   2. Heart sounds of the fetus.
   3. Feeling of definite parts of the fetus, as the leg or arm, through the abdominal wall.

B. Probable.
   1. Cessation of menstruation.
   2. Fullness and tenderness of the breasts.
   3. Morning sickness (nausea and vomiting).
   4. Frequency of urination.
   5. Enlargement of uterus and abdomen.

II. DURATION OF PREGNANCY.

A. An average of 273 days from time of conception.

B. Ovulation must precede conception, and relation of ovulation to conception is not always regular. (See Section I, Outline 2, Topic I.)

C. Date of confinement is calculated by—
   1. Counting forward 280 days from beginning of last menstruation.
   2. Or counting back three months from same date and then forward seven days.

D. An error of from two to three weeks is possible, but confinement is apt to be later, rather than earlier, than the date so calculated.

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III. CHANGES IN THE MATERNAL ORGANISM DURING PREGNANCY.

(See Murlin.)

A. The two most apparent changes and those which most affect the expectant mother are the growth of the uterus and the development of the mammary glands. (See Section I, Outline 2, Topic I, H; Outline 7, Topic II.)

B. The growth of the fetus has also an important influence on the general metabolism of the mother. This is shown in—

1. Marked changes in the physical and mental condition of the mother. (It is a common observation that a large percentage of mothers are physically much better at the end of pregnancy than before conception.)
2. Certain physiologic changes.
   (*a*) During a normal pregnancy, there is a total retention of nitrogen in excess of the needs of the fetus, the uterus, placenta, and mammaries. This positive nitrogen balance is marked at the end of pregnancy. (The body actually stores nitrogen as protein.)
   (*b*) The other chemical elements, phosphorus, sulphur, calcium, and magnesium probably show a similar gain. (Nature is presumably anticipating the coming drain of labor and lactation.)

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IV. PRENATAL CARE.

The protection of the fetal life and development and of the life and health of the mother depends largely on the proper care afforded the mother during pregnancy. The mother's ability to nurse her child and his chances of surviving infancy also depend largely on prenatal care. This should include:

A. Medical supervision.

1. Consultation with a well-trained physician as early in pregnancy as possible.
   (*a*) At this time there should be measurements of the pelvis, examination of the heart, lungs, abdomen, and urine, and an estimation of blood pressure.
   (*b*) In case of a first pregnancy, an internal examination of the pelvis should be made before the seventh month.
   (*c*) The urine should be examined every four weeks during the early months, at least every two weeks after the sixth month, and more frequently, if indicated.

A. Medical supervision—Continued.

1. Consultation with a well-trained physician as early in pregnancy as possible—Continued.

(*d*) A Wassermann blood test should be made if there are any indications of syphilis, so that vigorous treatment may be begun to prevent stillbirth or the development of syphilis in the infant. (See Standards for Child Welfare, pp. 151, 436; see Section III, Outline 4, Topic V.)

2. Maternity centers should be established so that medical and nursing supervision of pregnancy may be universally available for all women. (See Topic V.)

B. Ample nourishing diet.

1. Amount of food.

(*a*) Before the fifth month there is no special need to consider the food requirements of the child, since 90 per cent of the growth in weight is attained during the latter half of pregnancy. (See Section II, Outline 1, Topic VII, A, 3.)

(*b*) After the fifth month.

(1) The energy requirement of the fetus is supplied by an increase of 20 per cent in the mother's usual daily food supply. (This would mean the ingestion of 2,800 to 3,000 calories (net) daily, according to the amount of activity.)

(2) This increase in calories should be made largely in protein, especially milk and eggs, and not in carbohydrates.

(3) The carbohydrates may be somewhat curtailed during the last months of pregnancy, and the mother should be weighed at regular intervals so that excessive gain in weight may be prevented. (There is a total gain in weight during pregnancy of about 30 pounds.) (See Slemons, p. 72.) A child weighing over 8 pounds is an unnecessary danger to the mother. (See Section II, Outline 1, Topic VII, B, 1, *b*.)

B. Ample nourishing diet—Continued.

2. Character of the diet.

(*a*) The food must be adequate, especially protein of a high grade, and the essential minerals and vitamines must be furnished. If the protein and minerals are inadequate, the mother's supply will be drawn on, and the child grow at the expense of the maternal tissues. Since vitamines are only concentrated from the food, and are not constructed synthetically in the human body, although they may be stored to some extent in the body, the danger in a diet insufficient in vitamines is probably considerable. (See McCollum, p. 118.)

(*b*) Milk is in many ways an invaluable food in pregnancy as well as during the nursing period. (See Hoobler.)

(*c*) The amount of liquid, especially water, must not be curtailed. (At least a quart of urine should be passed daily; any diminution in the amount of urine should be reported to the physician.)

(*d*) Plenty of coarse vegetables and fruits should be included in the diet to check the common tendency toward constipation.

C. Body elimination.

1. A daily bath should be taken to promote skin elimination, as well as for cleanliness.
2. Constipation should be prevented by the use of laxative food or some harmless remedy, such as senna, prunes, or mineral oil.
3. Kidney elimination should be promoted by drinking a large amount of liquids.

D. Care of the breasts and nipples.

The breasts should be protected from pressure and the nipples should be developed to allow of suckling. The skin of the nipple should be toughened by daily washing, but it should be kept soft and pliable.

E. Attention to the teeth.

The teeth of the pregnant woman, which are especially likely to decay, should be examined early in pregnancy, and filled whenever necessary. Dental clinics should be included in every maternity center. (As prenatal impressions are not possible, there is no danger of marking a baby. See Section I, Outline 4, Topic I, A.)

F. Muscular exertion.

Exercise and necessary work must be moderated to prevent fatigue. (It is the unusual and extremely arduous labor that is dangerous.)

G. Rest and sleep.

Sufficient rest and sleep must be taken. (A woman who does her own housework should take short periods of complete relaxation daily several times, both during the morning and the afternoon.)

H. Clothing.

Suitable clothing adapted to the woman's condition should be provided, so that she may take outdoor exercise and have the possibility of recreation.

I. Outdoor exercise and ventilation.

Outdoor airing or exercise should be taken daily. (A woman who is compelled to do much indoor work should not exercise outdoors. Her rest should be taken outdoors or at least in a well-ventilated bedroom.)

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V. MATERNITY CENTERS.

Prenatal clinics, or maternity centers, have been established during the past 15 years in a few of our largest cities. The value of the care of the health of the mother, which includes medical and nursing supervision of the expectant mother, is demonstrated by the results of such work.

A. The reports on work of these centers in the poorest and most unhygienic quarters of Boston and New York show a reduction in:

1. Miscarriages and stillbirths.

   The proportion of stillbirths among women receiving prenatal care is only about half that among the general population.

2. Serious complications of pregnancy, as eclampsia.

   Threatened eclampsia fell in a four-year period, in Boston, from 10.2 per cent of all cases to no case. (See Prenatal Care, Report of Committee of the Women's Municipal League of Boston.)

3. Maternal deaths.

   The work done both here and in Europe shows that prenatal care, when it includes as it should proper care during confinement and the lying-in period reduces the mother's risk to a minimum. For every 1,000 supervised cases in New York City, the maternal mortality rate was 1.5, as against the usual city death rate of 4.9, a reduction of over 69 per cent. (See New York Milk Committee, Seventh Annual Report.)

4. Infant mortality.

   The work done in Boston, New York, and Baltimore shows that prenatal work should cause a reduction of 33 per cent in the mortality of babies under 1 month of age, and of 40 per cent in babies under 1 year of age, under what would occur without such service. (See Davis, "Relations of prenatal and postnatal work.")

B. Well-organized prenatal care, which includes proper feeding and supervision of the nutrition of the mother, results in a definite improvement in regard to:

1. Breast feeding.

   (*a*) The majority of women can nurse their babies.

   (*b*) Over 90 per cent under supervision furnish breast milk for at least the early months, a far larger proportion than among those without prenatal care.

2. General condition and vitality of the infant.

   (*a*) The average weight of the infant at birth whose mother received prenatal care shows a slight increase over that of the infant whose mother was without prenatal care.

3. The nutritive condition and general condition of the mother at the birth of the child.

C. The result of the work of maternity or prenatal centers in cities demonstrates conclusively the importance of such work and the need of establishing such centers in rural districts as well as in all cities.

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VI. MATERNAL MORTALITY.

The needless waste of life of women in the natural function of childbearing has only lately resulted in any definite steps to reach the underlying causes of this evil, which, though appreciated through the ages, has been accepted as an inevitable price women must pay for bringing new life into the world.

A. Extent of maternal mortality in the United States, 1919. (See Mortality Statistics, U. S. Bureau of Census, 1919.)

1. The estimated annual number of deaths from all causes connected with childbirth was 17,800.

A. Extent of maternal mortality in the United States, 1919—Con.
   2. The estimated annual number of deaths from childbed fever (puerperal septicemia) was 6,100.
   3. In 1919 the annual death rate from all causes relating to maternal mortality per 1,000 live births was 7.4.
   4. In 1919 the annual death rate for childbed fever per 1,000 live births was 2.5.

B. Childbed fever (puerperal septicemia).
   This is the most frequent cause of death among childbearing women, and is practically always preventable. (See Section I, Outline 4, Topic III, E.)
   1. It is a form of wound infection, largely due to the introducing of infection on the hands of the attendant at the time of delivery.
   2. Its nature was discovered in 1843, and during the intervening 75 years all other forms of wound infection have yielded to the development of preventive medicine and aseptic surgery.
   3. There has been no decrease in the number of cases of puerperal septicemia under private care, although there has been a marked decline in the death rate from this cause in hospitals.

C. Status of maternal mortality in the United States.
   1. The United States has a higher maternal death rate than any other of the principal countries.
   2. The maternal mortality rate has increased from 6.1 in 1915 to 7.4 in 1919.
   3. Childbirth causes more deaths among women from 15 to 44 years of age than any other disease except tuberculosis.
   4. During the 17 years from 1900 to 1917 the typhoid rate has been reduced to one-third its former rate, the tuberculosis rate has been markedly reduced, and the diphtheria rate has been reduced more than one-half.

D. Status of maternal mortality in other countries. (See Meigs, Maternal Mortality from All Conditions Connected with Childbirth in the United States and Certain Other Countries.)
   1. The noticeably low rates in certain countries, such as Sweden, Norway, and Italy, show that maternal mortality can be controlled.

D. Status of maternal mortality in other countries.—Con.
   2. During the years between 1900 and 1913 there has been a decline in the death rate from childbirth per 1,000 live births in England and Wales, Ireland, Japan, and Switzerland.
   3. Even during the period of the war certain belligerent countries by intensified work for the welfare of women and children actually lowered their infant mortality and greatly improved conditions surrounding maternity. (See Meigs, "Infant welfare work in war time.")

E. Underlying causes of maternal mortality.
   1. General ignorance of the need of hygienic care and skilled attendance during pregnancy and labor.
   2. Difficulty of obtaining adequate obstetrical and nursing care, including hospital care for operative cases.
   3. Dearth of attendants sufficiently skilled in obstetrics or midwifery (a surgical specialty).
   4. Inaccessibility to adequate care in remote or rural districts. (See Section III, Outline 5, Topic III, G.)

VII. RELATION BETWEEN MATERNAL MORTALITY AND INFANT MORTALITY.

A. It has been demonstrated that the deaths of women in childbirth are closely correlated with the number of stillbirths and infant deaths at birth.

B. More infants die during the first year of life from conditions related to the health and care of the mother than from any other cause. The number of deaths in infancy from prenatal and natal causes (which in 1916 was 41.2 per cent of infant deaths from all causes) corresponds very closely to the number of deaths from all causes the first month of life. (See Table II.)

C. A comparison of infant deaths in 1910 and in 1916 in the death-registration States of 1910 shows that the number of deaths during the first month of life has not decreased, but has increased. However, since the population was greater in 1917 and the total number of births sufficiently larger to make the death rate per 1,000 births probably slightly better in 1917 than in 1910, the actual number of deaths of infants over one month of age, in spite of the increased number of births, shows a demonstrable decrease during the same period.

D. The fact that the so-called birth mortality (deaths the first month of life), like the deaths of women from childbirth, shows little or no decline proves clearly that we have not attacked the root of the problem.

E. The prevention of maternal mortality and infant mortality (including stillbirths) depends on—

1. Sufficient income for family needs. (See Section III, Outline 6, Topic II.)
2. Health and right living of parents (the control of venereal disease). (See Jeans.)
3. Prenatal care and instruction of mothers. (See Topic IV.)
4. Skilled assistance during confinement. (See Section I, Outline 5, Topic I.)
5. Rest and adequate care in lying-in period. (See Section I, Outline 6, Topic IV.)
6. Protection of nursing period and breast feeding. (See Section I, Outline 7.)
7. Maternal knowledge of infant and child hygiene. (See Section I, Outline 8.)

TABLE II.—*Infant deaths (exclusive of stillbirths) from all causes, and from conditions relating to the mother, for certain subdivisions of the first year of life, United States registration area.*[1]

Cause of death.	Infant deaths.							
	Under 1 year.		Under 1 day.		Under 1 week.		Under 1 month.	
	1916	1917	1916	1917	1916	1917	1916	1917
All causes	164,660	171,024	25,908	26,665	52,418	53,748	75,583	78,588
Prenatal and natal conditions (total)[2]	68,509	70,270	24,632	25,301	46,050	47,298	57,730	59,672
Malformations	10,638	10,980	2,358	2,329	6,266	6,329	8,334	8,579
Premature birth	33,123	34,704	16,305	17,078	26,429	27,538	31,661	33,191
Congenital debility	16,281	15,713	2,851	2,579	7,230	6,991	10,626	10,420
Injuries at birth	6,274	6,631	2,941	3,132	5,694	5,996	6,199	6,560
Syphilis	2,193	2,242	177	183	431	444	910	922
Other causes	96,151	100,754	1,276	1,364	6,368	6,450	17,853	18,916

[1] Compiled from U. S. Bureau of the Census, Mortality Statistics, 1916, p. 483, and 1917, p. 523.
[2] During the first year of life deaths from prenatal and natal conditions formed 41.6 per cent of infant deaths from all causes in 1916; 41.1 per cent in 1917; and 39.2 per cent in 1918.

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OUTLINE 4. DISORDERS AND DANGERS OF PREGNANCY.

Pregnancy, including parturition (birth), is a normal, physiologic process. The definition of pregnancy should be "health under a strain" and not "a disease of nine months' duration." The outcome, as in an athletic contest, depends on proper hygiene, scientific management or supervision, and the courage and will to endure to the end. A mother can injure the child she carries just as much during the nine months before birth as during the nine months after birth. On the other hand, by right living a mother can improve the physical condition of her unborn child.

I. DISORDERS OF COMMON AILMENTS.

A. Disturbances of digestion are usually confined to the early months.

1. Morning sickness (nausea and vomiting).

(*a*) This occurs in the early months of about one-third of all pregnancies.

A. Disturbances of digestion are usually confined to the early months—Continued.
   1. Morning sickness (nausea and vomiting)—Continued.
      (*b*) Treatment consists in regulation of diet.
         (1) A hot drink or dry solid food should be taken before rising.
         (2) Meals should be light but frequent (milk should be included if possible).
      (*c*) Morning sickness should not be confused with pernicious vomiting of pregnancy.
         (1) In this serious condition, the nausea is uncontrollable and the patient is weakened by loss of food and subsequent loss in weight to the point of exhaustion.
         (2) This disorder, which is closely allied to toxemia and may be considered with it, demands vigorous medical attention.
   2. Heartburn (increase of gastric acidity).
      (*a*) Treatment consists in diluting contents of stomach with hot water, or using simple alkali such as bicarbonate of soda, and avoiding fatty or fried foods.
   3. Flatulence (gas in stomach and bowels).
      (*a*) Treatment consists in lessening fermentation by eliminating sugars and starch from the diet (buttermilk should be tried).
   4. Decay of teeth.
      (*a*) This is due to hyperacidity and expenditure of lime for fetus.
      (*b*) Treatment consists in brushing teeth and gums frequently; an alkaline mouth wash should be used.
      (*c*) The amount of lime in the food should be increased (milk, vegetables, and fruit supply this need).

B. Disturbances of elimination are common.
   1. Constipation.
      (*a*) It is more severe during the later months, due to pressure of the growing fetus.
      (*b*) Treatment consists in taking coarse foods giving undigested residue, fruits, mineral oil, and cathartic drugs (when prescribed by physician).

B. Disturbances of elimination are common—Continued.
   2. Scanty urination.
      (*a*) Treatment consists in increasing amount of intake of fluids, if possible, and the measuring of the urine daily to determine the effect of the treatment. Skin should be made to help out kidney function by use of hot drinks, hot baths, hot packs, and medicinal treatment.

C. Other disturbances may occur.
   1. Excitability.
   2. Depression.
   3. Sleeplessness.
   4. Irritability.
   5. Headache.

D. Pressure symptoms of greater or less severity may be experienced.
   1. Pressure downward, especially during the early months, causing—
      (*a*) Swollen legs.
      (*b*) Varicose veins.
      (*c*) Hemorrhoids.
      (*d*) Neuralgia.
      (*e*) Cramps and numbness.
   2. Pressure upward, during later months, causing—
      (*a*) Shortness of breath.
      (*b*) Palpitation of heart.
      (*c*) Broken sleep.

II. FALLACY OF MATERNAL IMPRESSIONS.

After fertilization has occurred it is probably not possible for the mother directly to affect, either for good or bad, the structural development of the fetus. The relation of the fright of the mother to deformity of the child, for example, is one of coincidence and not one of cause and effect, as generally supposed.

A. There are no vascular or nervous connections with the mother.
B. The child's form is fixed after the second month of life.
C. Every woman experiences fright or shocks and yet few children show so-called birthmarks.

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III. DANGERS OF PREGNANCY.

A. Miscarriage usually occurs during the early months. It includes abortion (birth of fetus before quickening) and premature birth (birth after seventh month, when child is viable), whether born alive or stillborn.

1. Causation.
   - (*a*) Preexisting disease (especially syphilis). (See Section III, Outline 4, Topic V.)
   - (*b*) Intercurrent disease.
   - (*c*) Misplacement or malformation of uterus.
   - (*d*) Disease of the lining of the uterus.
   - (*e*) Accidents, such as falls or jarring of automobile.
   - (*f*) Drugs.
   - (*g*) Violent emotion.
2. It can be prevented by correction of abnormality, by cure of disease, and by proper prenatal hygiene.
3. It tends to become habitual and to recur.
   - (*a*) It occurs much more frequently than is generally supposed; according to embryologists there are probably half as many miscarriages as live births.
   - (*b*) It occurs at the same period in successive pregnancies.
   - (*c*) It usually occurs at the time the woman would menstruate, if she were not pregnant.
   - (*d*) Recurring miscarriage suggests the possibility of syphilis; the Wassermann blood test should be made to settle the question.
4. Symptoms.
   - (*a*) Show of blood.
   - (*b*) Intermittent abdominal pains.
5. Treatment.
   - (*a*) There is great danger that some part of the fetus or membrane may be retained and cause hemorrhage or serious infection. If unavoidable, the miscarriage should be treated as a real labor. The patient should rest in bed under a physician's care.
   - (*b*) On symptom of miscarriage, or at the period of previous miscarriage, the patient must go to bed immediately and should remain in bed until all symptoms are over; and every 28 days, at the time menstruation would occur if the woman were not pregnant, she should go to bed for several days. This may prevent actual miscarriage.

B. Auto-intoxication or toxemia (self-poisoning from body of patient) is not a real Bright's disease or nephritis, but has similar symptoms. In severe cases, convulsions followed by coma develop (so-called eclampsia). It usually occurs during the later months of pregnancy.

1. Causation—The cause is obscure; the following theories are the most tenable:
   (*a*) Abnormal nutritional processes of fetus.
   (*b*) Improper functioning of internal organs of mother.
   (*c*) Lack of power in excretory apparatus of mother to carry off body waste of herself and child so that waste products accumulate in system and poison mother.
2. Onset.
   (*a*) A woman may suddenly, with no warning at any time, and especially during the last days of pregnancy, become convulsive and symptoms may resist all treatment until death follows.
   (*b*) Usually premonitory symptoms, especially urinary suppression and albuminuria, are gradual and plenty of warning is given.
3. Symptoms.
   (*a*) Dull, constant headache.
   (*b*) Violent vomiting.
   (*c*) Dizziness, impaired vision, or black spots before eyes.
   (*d*) Cramp-like pain in stomach.
   (*e*) Puffiness of face and swelling of extremities.
   (*f*) Itching of skin.
   (*g*) Albumin and casts in urine.
   (*h*) Suppression of urine.
   (*i*) Somnolence.
   (*j*) Coma.
   (*k*) Muscular twitching or convulsions.
   (*l*) High blood pressure.
4. Prevention.
   (*a*) Attention should be given to the excretory organs—bowels, kidneys, and skin.
   (*b*) Proper diet, large intake of water, frequent baths, and the correction of constipation should be maintained.
   (*c*) Careful examination of urine should be made by physician at least every four weeks during the early months and at least every two weeks after

B. Auto-intoxication or toxemia, etc.—Continued.

4. Prevention—Continued.

the sixth month. If albumin and casts are present, urine should be examined daily and blood pressure tests made.

5. Treatment.

(*a*) Physician should be consulted at onset of any of foregoing symptoms. (Taken in time most cases of beginning toxemia can safely go on to full term delivery.)

(*b*) Liquids should be increased in the diet, and every effort should be made to increase the urine.

(*c*) Bowels should be evacuated and perspiration produced by hot baths, etc.

(*d*) The diet should be light and nutritious, largely liquid. No meat should be eaten.

(*e*) Labor should be forced if patient is convulsive, and constant medical attention given until condition disappears.

6. Result.

(*a*) Next to puerperal infection, toxemia is the cause of the greatest number of deaths among child-bearing women.

(*b*) True eclampsia is frequently fatal to child.

(*c*) It rarely means a real kidney lesion.

(*d*) Symptoms may not have occurred with previous pregnancies, or may not reoccur in subsequent pregnancies.

(*e*) If woman survives, recovery is usually complete.

C. Placenta previa is the name given to the development of the placenta near the cervix; so that it comes to lie over the opening of the uterus, in the way of the child. (The placenta is usually developed near the top or fundus of the uterus.)

1. Causation.

(*a*) The cause is obscure.

(*b*) The reason for the abnormal location is not known.

2. Symptoms.

(*a*) Hemorrhage without cause or pain, especially during the last three months of pregnancy, is usually due to placenta previa.

(*b*) When the cervix begins to dilate, the attachment of the placenta is loosened, causing more or less hemorrhage.

C. Placenta previa, etc.—Continued.
   3. Treatment and result.
      (*a*) The physician should be notified at once in case of any show of blood during pregnancy.
      (*b*) Placenta previa is very serious, as fatal hemorrhage is not uncommon.

D. Extra uterine pregnancy, or ectopic gestation, is the development of pregnancy outside of the uterine cavity.
   1. Causation.
      (*a*) The fertilized ovum is arrested in its passage to the uterus and develops where it lodges (fortunately, this occurs rarely).
      (*b*) Usually this arrest takes place in the tube, occasionally in the ovary or the abdomen.
   2. Symptoms.
      (*a*) During early pregnancy, a feeling of pain or fullness in the side may be noticeable.
      (*b*) Rarely an abortion may supervene, and the results of pregnancy may be discharged.
      (*c*) Between the third and fourth months, symptoms of rupture of the tube, extreme pain, internal hemorrhage, and shock are apt to occur.
   3. Treatment and result.
      (*a*) Prompt surgical interference is usually necessary to save the life of the patient.
      (*b*) The abdomen has to be opened, if the tube has not ruptured, or if it has ruptured and there is internal hemorrhage.

E. Child-bed fever (puerperal septicemia) is a wound infection (similar to infection after an accident or operation) occurring during childbirth or miscarriage, or in the first few days after confinement, before the repair of uterine tissue is complete. (See Section I, Outline 3, Topic VI, B.)
   (*a*) History. (See Meigs, pp. 10–11.)
   (*b*) Method of infection.
      (1) From the hands or instruments of the attendant during or after confinement.
      (2) From the hands of nurse or attendant or patient herself in care during lying-in period.
      (3) Preexisting infection of patient's genital tract.
      (4) Rarely from bacteria harbored by the patient before confinement and reaching broken surfaces of uterine lining in blood stream.

E. Child-bed fever, etc.—Continued.

(*c*) Symptoms.

(1) Fever usually on third or fourth day after labor.

(2) Foul-smelling vaginal discharge.

(3) Abdominal pain.

(4) Headache.

(5) Prostration.

(*d*) Prevention.

It is almost wholly preventable by—

(1) Proper personal hygiene.

(2) Strict surgical cleanliness during labor and after care. (Infection acquired during or after confinement or during lying-in period can be eliminated by proper asepsis.)

(*e*) Treatment.

(1) Nursing and medical attention as in a serious case of infection.

(2) Liquid or semisolid diet.

(3) Temporary weaning of infant.

(*f*) Result.

(1) At present, it is the chief single cause of deaths from childbirth. (Over 6,000 women in the United States died, in 1919, from this preventable infection.)

(2) Milk leg (phlegmasia alba dolens) may result. This is a stoppage in the circulation from the veins of the pelvis due to clotting caused by infection proceeding from an infected uterus.

(3) Embolism may result. This is a plugging of the vessels of the heart or lungs due to a bit of clot in such thrombosed vein breaking off and getting into the general circulation, usually causing instant death.

(4) It frequently causes chronic infection and permanent invalidism.

(5) It is an important cause of sterility.

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OUTLINE 5. CONFINEMENT.

Medical supervision of the expectant mother should begin early in pregnancy and should continue throughout labor and the lying-in period. It is not safe in childbirth to wait until the last moment to secure the services of a doctor and a nurse, or to select them without due consideration. Obstetrics is a special branch of surgery, and since any labor may develop into an operative case, the utmost training and skill in both attendants is essential to safeguard the life of the mother and child. Labor is an act of nature, but it is not true that a woman can always be delivered safely without skilled assistance. Civilization tends to produce a larger size head in the infant to correspond with the increase in brain, while at the same time woman is becoming less well developed physically, as she does less muscular work.

I. NECESSARY ATTENDANTS.

(See Section III, Outline 7, Topic II, B, 6, 8.)

A. A physician is advisable to insure the safe delivery of the patient. If a physician is not available, a registered midwife should be secured. The choice of a physician should not depend on personality alone, but on his—
   1. Special training.
   2. Skill and cleanliness.
   3. Experience.

B. A nurse is essential for the care of the patient.
   1. Training.
      (*a*) Only women who have had a thorough hospital training in the care of confinement cases are properly equipped to undertake maternity work.
      (*b*) The registered nurse has to have such experience; the practical, domestic, or monthly nurse rarely is well trained.
   2. Length of time needed.
      (*a*) A nurse is indispensable from one to two weeks, better from two to four, or longer.

C. Domestic help must be assured.
   1. Relief from household duties must be obtained, whether or not a nurse can be secured or afforded.
   2. The mother should not be expected to attend to housework or to take care of other children for at least the first two weeks after confinement. She should do no heavy work for at least a month. (See Section I, Outline 6, Topic II.)

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II. PLACE OF CONFINEMENT.

A. The hospital as compared with the home is:
   1. Cheaper.
   2. Safer.
   3. Easier.

B. There is need for good county hospitals in rural communities where at present doctors, nurses, and domestic helpers are unknown factors. (See Section III, Outline 5, Topic III, G.)

C. Maternity wards or pavilions with separate nursing and medical attendants are necessary to have hospitals safe for maternity.

D. Essentials for confinement in home include:
   1. Separate room.
   2. Lighting, ventilation, heating, quiet, and nearness to bath room to be considered.
   3. Single bed, preferably of metal, with good springs and comfortable mattress.
   4. Room and bed not previously used for recent case of infectious disease.

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III. NECESSARY SUPPLIES.

A. Anesthetic, disinfectants, rubber gloves, instruments usually brought by physician.

B. Half a dozen clean, freshly ironed nightgowns. (Old nightgowns cut off and hemmed just below the waist are a great convenience.)

C. Plenty of clean, freshly ironed sheets and pillow cases.

D. Supply of clean newspapers.

E. Necessary articles for delivery. (See De Lee, pp. 93–94; Slemons, pp. 202–204; West, p. 22.)

F. Preparation and sterilizing of confinement outfit. (See Slemons, pp. 217–219; West, pp. 23–24.)

G. Infant's outfit. (See De Lee, pp. 99–104; Slemons, pp. 210–211; Infant Care (Revised), p. 18.)

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IV. PREPARATION FOR CONFINEMENT.

A. Care of the room.
   1. Ornaments and all unnecessary furniture, pictures, and hangings should be removed.
   2. Rugs should be removed or carpet covered thoroughly with newspapers, especially near the bed.
   3. Entire room should be carefully house cleaned. Woodwork and furniture should be wiped with damp cloth.

B. Care of the bed.
   1. The bed should be placed so that both sides are freely accessible.
   2. If mattress is not 20 inches from floor, the bed should be raised on wooden blocks.
   3. The bed should be placed so that the light from the window falls across the foot.
   4. Artificial lighting, if present, should illuminate the foot of the bed.
   5. The mattress should be flat and firm; it should be protected by a large rubber cloth and covered by a sheet; and a small rubber cloth and a draw sheet should be under the patient's hips.

C. The bedclothes should include a clean sheet, blanket, and spread during the early stages of labor; near delivery, sterile sheets should be put over and under patient.

D. Care of the patient.
   1. An enema of soap suds should be given.
   2. A full bath should be given, using freshly laundered towels and wash cloths. The body should be scrubbed from the ribs to the knees, giving special attention to the genital regions.
   3. The pubic hair should be clipped or shaved.
   4. The patient should wear a clean, freshly ironed nightgown and wrapper.
   5. The hair should be braided in two tight braids.

READING REFERENCES IV.

De Lee, cited above, pp. 107–114.
Slemons, cited above, pp. 220–231.

V. LABOR.

The physiologic process of expelling the product of conception, because of the extreme expenditure of energy involved is called labor.

A. The cause of labor is unknown.

B. The premonitory symptoms are as follows:

1. "Lightening."

   This is due to the sinking of the child's head into the pelvis the last two weeks, and the falling forward of its body. (Mother breathes better, but walks with more difficulty.)

2. False pains.

   These are abdominal pains, occurring from a few days to a few weeks before labor.

3. "Show."

   A discharge of blood-stained mucus from the vagina may occur from a few hours to 24 hours before labor. It is occasionally absent, or may occur during labor.

C. The onset of labor includes:

1. "Show."
2. Pains at first in the back, drawing around to the front. These are due to the regular but intermittent contractions of the uterus.
3. Rupture of the "bag of waters." This loss of the fluid surrounding the fetus in the uterus should not occur until the end of the first stage of labor, as it helps to:
   - (*a*) Dilate cervix and vagina gently and evenly.
   - (*b*) Protect the baby from injurious pressure on any one part.
   - (*c*) Prevent prolapse of umbilical cord.
   - (*d*) Prevent infection of baby's eyes from vaginal secretions.
4. Premature rupture of the membranes. This may occur several days before labor; causes a slow delivery, so-called "dry labor."
5. Beginning dilation of the cervix. This is only ascertainable by the doctor, as no vaginal examination is otherwise permissible.

D. The course of labor is in three stages.

It has been well described as a mechanical operation, where the expellent force of the uterine and abdominal muscles furnishes the power to drive the passengers (the child and placenta) through the passages (the maternal

D. The course of labor is in three stages—Continued.
cervix, vagina, and vulva) into the external world. (See De Lee, pp. 59–60.)

1. First stage.

(*a*) Its duration is 16 hours in an average first labor to 11 hours or shorter in subsequent confinements.

(*b*) It covers the period of complete dilation of the cervix of the uterus.

(c) The pains, grinding cutting, or colic-like in character, are due to contractions of the uterus. The usual interval is from 30 to 5 minutes, becoming more frequent and regular and also more painful as labor progresses.

(*d*) Care of patient.

(1) A physician should be notified.

(2) The patient should be prepared for delivery. The urine should be examined if possible.

(3) The patient should be allowed to be up and to walk about the room, but should be urged to rest between pains.

(4) The nurse or attendant should be with the patient, but should take necessary sleep and food.

(5) The patient should be encouraged to take light, nourishing food at regular intervals, if possible. Faintness, delayed labor, or even postpartum hemorrhage may result from weakness following prolonged lack of food.

(6) The patient's mind should be diverted when possible by some occupation such as reading, knitting, sewing, etc.

2. Second stage (stage of expulsion).

(*a*) Its duration is about two hours.

(*b*) It covers the period from the time the head passes through the cervix of the uterus until the child passes through the vagina into the outer world.

D. The course of labor is in three stages—Continued.

2. Second stage (stage of expulsion)—Continued.

(*c*) The pains are bearing down in character due to the contracting force of the abdominal muscles. They are much more powerful and more painful than in the first stage. The intervals are more frequent and more regular (every two or three minutes).

(*d*) Care of patient.

(1) A physician should be in attendance during the entire second stage, which occasionally is very short.

(2) Preparations for delivery should be completed.

(3) Fetal heart tones should be observed frequently, especially if an anesthetic or narcotic is used.

(4) The patient should be in bed, preferably on her back.

(5) The bedclothes and night clothes should be changed to sterile ones.

(6) The patient should not be allowed to bear down or work to expel child without the physician's orders.

(7) The patient should be encouraged to rest between pains, to keep up her strength and courage, and to shorten her suffering by following the orders of the physician and nurse.

(8) The patient's comfort should be considered in all details which do not prejudice the outcome of the case.

(*e*) Anesthetics.

(1) Analgesia (deadening of pain) by means of partial anesthesia from chloroform, ether, or nitrous oxid-oxygen should be carried out at least in the second part of the expulsion stage (second stage) of labor. An anesthetic given only during the height of a pain does not lessen its effect. Relief given in this way conserves the mother's

D. The course of labor is in three stages—Continued.

2. Second stage (stage of expulsion)—Continued.

(*e*) Anesthetics—Continued.

strength, shortens labor, and saves her from unnecessary shock. Anesthetics should not be given except by a person trained and accustomed to their administration, for a certain amount of risk attends their use, and can be minimized only by constant practice.

(2) Amnesia (forgetfulness of pain) is obtained by the use of scopolamin-morphin (twilight sleep). This procedure should be used only in normal cases, in hospitals or maternity wards equipped for this purpose, where continuous attendance by a physician and nurse is possible. It demands the most careful nursing. It is not free of unnecessary risks, either to mother or child, as cases of maniacal delirium are on record and as the infant usually shows some degree of narcosis, occasionally being born asphyxiated.

(*f*) Delivery.

(1) As soon as child's head is born, the eyes, nose, and mouth are wiped with warm boric solution.

(2) A short rest is taken and the body is born. The child should cry lustily. If it does not breathe well, measures to stimulate respiration should be tried.

(3) The nurse receives baby in warm towel and places it near mother, taking care it is not exposed or chilled.

(4) The cord is tied, cut, and covered with sterile gauze.

(5) The baby is placed in a warm basket and covered. It should be carefully watched for hemorrhage, or signs of asphyxia.

D. The course of labor is in three stages—Continued.
2. Second stage (stage of expulsion)—Continued.
(*f*) Delivery—Continued.
(6) The eyelids are washed with sterile water and one drop of from 1 to 2 per cent silver nitrate solution (or other similar substance) is put in each eye.
(7) The toilet of the baby is made after labor is finished and the mother made comfortable.
3. Third stage.
(*a*) Its duration is from the time of expulsion of the child until the afterbirth is expelled and the uterus firmly contracted.
(*b*) The pains cease and patient is greatly relieved.
(*c*) Afterbirth pains then recur every three to five minutes, but are not very severe.
(*d*) After 10, 20, or 30 minutes, occasionally several hours, the woman bears down. or the physician presses on the uterus, when the placenta and membranes are expresssd with more or less hemorrhage.
(*e*) The uterus contracts into a hard ball.

READING REFERENCES V.

De Lee, cited above, pp. 56–63; 105–142.
Slemons, cited above, pp. 236–241; 241–256.
West, Prenatal Care, cited above, pp. 26–29.

VI. AFTER LABOR.

A. The physician should make necessary repairs immediately.
B. The patient should be cleaned up; all soiled dressings and linens should be removed. The patient should be given a hot drink if chilled, and should be urged to sleep. No visitors should be allowed for at least 12 hours.
C. The nurse or attendant should watch the uterus to see that it is kept contracted and hemorrhage prevented.
D. If there is unusual bleeding or the nurse feels the uterus relaxed and baggy under her fingers, it should be kneaded until it contracts and expels clots of blood. It should be kept contracted by constant massage. A physician should be called if this bleeding, or postpartum hemorrhage, is prolonged.

E. After pains due to uterine contraction may continue for several days in women who have previously born children. The physician may prescribe anodynes, if pains are unusually severe.

F. The nurse should note condition, color, breathing, and pulse of mother and child. Reports of unusual symptoms, especially headache, should be made to physician.

READING REFERENCE VI.

De Lee, cited above, pp. 138–145; 149–150; 318–319.

VII. BIRTH EMERGENCIES.

A. Birth without a physician.
B. Prolapse of cord.
C. Asphyxiation of child.
D. Postpartum hemorrhage.
E. Eclampsia. (See Section I, Outline 4, Topic III, B.)

READING REFERENCES VII.

De Lee, cited above, pp. 276–281; 282–298; 382–386.
Slemons, cited above, pp. 266–274.
West, Prenatal Care, cited above, pp. 28–29.

OUTLINE 6. THE LYING-IN PERIOD.

The time immediately following childbirth is generally known as the lying-in period, or puerperium (child's period). During this period, the mother should recover her former strength and develop breast milk, and the infant should become adjusted to a new environment. The nurse or attendant is now responsible for the welfare of the mother and baby. The final outcome of normal childbirth is due to the skill and asepsis of the doctor at the time of the delivery plus that of the nurse during the puerperium.

I. NECESSITY FOR REST IN BED.

A. The enlarged uterus is easily misplaced.
B. The stretched and relaxed muscles and ligaments can not support the abdominal organs.
C. Perineal tears must heal.
D. Torn surfaces are easily infected.
E. Hemorrhage may be started.

II. DURATION OF NEEDED REST AFTER CONFINEMENT.

Many women, on account of lack of means or service, can not follow an ideal plan for at least six weeks of rest after childbirth, but are

forced to get up too soon and to care for their babies after the first few days, if the confinements have taken place at home, or if hospital cases, immediately on their return home. No woman after childbirth, if there is another able-bodied adult in the household, should be allowed to do heavy work, such as washing, for at least one month.

A. In uncomplicated cases (no stitches) the patient may—

1. Sit up in bed on the seventh day.
2. Be up in a chair on the tenth day.
3. Stand on her feet on the eleventh day.
4. Walk about the room on the twelfth day.
5. Come down stairs, once a day, on the fifteenth day.
6. Go up and down stairs and take full charge of baby after the fourth week.
7. Resume household duties after the sixth week.

B. In operative cases, or where stitches have been taken, the time for getting up, walking, and resuming work should be delayed and should be prescribed by the doctor in charge.

READING REFERENCES I AND II.

De Lee, Joseph B.: Obstetrics for Nurses, W. B. Saunders Co., Philadelphia, 1918, pp. 166–168.

Slemons, J. Morris: The Prospective Mother, D. Appleton & Co., New York, 2d edition, 1921, pp. 275–277; 295–298.

West, Mrs. Max: Prenatal Care, U. S. Children's Bureau, Publication No. 4, 1915, p. 31.

III. PHYSIOLOGIC CHANGES DURING PUERPERIUM.

A. Retrogressive changes take place.

By a process of dwindling and shrinking, called involution, the enlargement of the muscles of the uterus and abdomen, which occurred as a necessary part of pregnancy, disappears.

1. The uterus diminishes from 2 pounds to 2 ounces in weight.
2. The uterine ligaments become taut.
3. The lining membrane of the uterus is cast off and renewed. (The flow of waste from the genitals is called "the lochia.")
4. The vagina, vulva, and perineal floor return to normal condition.
5. The abdominal muscles become shortened and thickened.
6. From 10 to 15 pounds are lost at birth. Further loss in weight (up to one-tenth of the body weight) may occur during the puerperium.
7. The waste of tissue accompanying these changes is taken care of largely by increased body excretions. This is especially shown in excessive perspiration.

B. Progressive changes occur in the breasts to fit them for the function of lactation.
   1. The secretion in the breast from the first to the third day is called "colostrum." This has a cathartic action.
   2. On the second or third day, the breasts become swollen, hard, and painful, due to an engorgement of lymph and blood.
   3. The breasts now contain milk, which is formed mostly during the time of nursing itself.
   4. If the breasts are not stimulated by nursing, the engorgement subsides gradually.
   5. The engorgement of the breasts causes no fever. "Milk fever" is due to sepsis.
   6. Nursing stimulates the contraction of the uterus and so furthers involution.

READING REFERENCES III.

De Lee, cited above, pp. 63–69.
Slemons, cited above, pp. 277–290.

IV. CARE OF THE MOTHER DURING PUERPERIUM.

To prevent infection, the strictest cleanliness (asepsis) is necessary in nursing the patient during this period, as open wounds and delicate new tissue are present in both the mother and the child.

A. Genitals.
   1. While the mother is in bed the vulva should be dressed at least every six hours, and after every bowel movement or urination. During this procedure—
      (*a*) The nurse should sterilize her hands.
      (*b*) She should use only sterile dishes and solutions.
      (*c*) She should wash off the vulva by pouring over it sterile antiseptic solution.
      (*d*) She should dry it with sterile cotton.
      (*e*) She should cover it with a sterile pad, held in place by a T bandage.
   2. After the mother is up, she may be taught to dress her own vulva, but sterile pads should be used until the lochia disappears.

B. Bath.
   1. As perspiration is excessive, the patient should have a complete sponge bath with soap and warm water every morning and an alcohol rub at night. The nightgown and bed linen need frequent changing.
      (*a*) Tub bath may be taken after the third week.

C. Diet (normal case).

1. Liquids to quench the thirst may be given on the first day, later a cup of broth or glass of milk.
2. A soft diet should be allowed on the second day.
3. A light general diet may be given on the third day. The patient should have three meals a day and milk, cocoa, or buttermilk between meals.
4. Acid fruits, beans, pears, onions, and tomatoes should be restricted until the patient is up. Indigestible foods should be avoided. Tea or coffee may then be given once a day.
5. An abundance of water must be taken to make up the loss of fluid in excretions and in milk. Water may be given between meals if food drink causes indigestion.
6. An unrestricted general diet should be allowed after the patient is up and about. (See Section I, Outline 7, Topic V, A.)

D. Bowels.

1. A dose of castor oil should be taken on the morning of the second day, before any solid food is taken.
2. Constipation must be avoided. Daily enemata may be given while the patient is in bed, or a mild laxative, such as mineral oil.
3. Coarse cereals and fruits should be added to the diet to control constipation.
4. Cathartic drugs should be used only as prescribed by physician.

E. Urine.

1. Inability to urinate is common after labor.
2. The bladder must be emptied within 10 hours after delivery. Every expedient should be tried before catheterization. (See De Lee, pp. 161–162.)
3. An excessive amount of urine is the rule during this period.

F. Sleep.

Exhaustion from lack of sleep is common in women with newborn babies. It is desirable to have—

1. As long a sleep as possible after labor.
2. A long night sleep, with as few interruptions as possible, the first week.
3. Unbroken sleep between 10 p. m. and 6 a. m., as soon as the baby can safely dispense with the night feeding.
4. An afternoon nap as long as the woman nurses.

G. Breasts.

After the mother has slept and taken liquid nourishment, the breasts are prepared by—

1. Washing them with soap and water.
2. Washing the nipples with a saturated solution of boric acid, both before and after nursing.
3. Using sterile albolene if the nipples are tender.
4. Keeping nipples covered with pieces of sterile linen.
5. Supporting them with a breast binder if they are heavy or "cake."
6. Forbidding the manipulation of the breast except as directed by the physician.

H. General care of the patient.

1. The pulse, temperature, and respiration should be noted three times a day at first and recorded for the physician.
2. Free ventilation of the bedroom should be maintained day and night.
3. Plenty of sunshine and fresh air should be provided.
4. No visitors should be allowed but relatives the first week, and visits should be restricted in time and number.
5. Gentle massage and passive exercises may be taken after the first week.

I. Final examination.

1. It is a wise modern practice for a physician personally to supervise the puerperium whenever it is possible, by making daily visits the first week, and visits at an interval of a few days until the mother is permanently up. In maternity center work the visiting nurse makes these visits and reports to the physician. (See Section I, Outline 3, Topic V.)
2. Before dismissing the case, the physician should give the patient a physical examination, including a thorough examination of pelvis. This is usually done when the baby is from 4 to 6 weeks old. By this precaution many future weaknesses and disorders of the mother may be prevented.

READING REFERENCES IV.

De Lee, cited above, pp. 151–168.
Slemons, cited above, pp. 275–300.
West, cited above, pp. 32–35.

V. CARE OF THE NEWBORN INFANT.

(See Section I. Outline 8, Topics IV–XII.)

A. At birth.

1. The stump of the cord should be covered with a sterile gauze dressing.
2. The eyes, nose, and mouth should be washed with a sterile saturated solution of boric acid.
3. Prophylactic treatment of the eyes should be given for gonorrhea; one drop of a fresh solution of 1 per cent nitrate of silver, or 10 per cent protargol, or 25 per cent argyrol, in each eye. (See Section III, Outline 2, Topic I, G.)
4. The child should be wrapped in a blanket and put in a basket in a warm place.

B. The first toilet.

1. The child should be oiled all over with warm olive oil, albolene, or sterile lard (plenty of oil should be used).
2. The oil and with it the cheesy material (vernix caseosa) covering the skin should be wiped off with a clean soft towel.
3. The region of the cord should be washed with an antiseptic solution, and covered with a dry sterile dressing and binder.
4. The child should then be dressed quickly, placed in a basket, and covered suitably, according to the temperature of the room. A hot water bag should be put in the basket, but not near the child.

C. The daily care.

1. An oil rub or a sponge bath should be given daily until the cord is off.
2. A tub bath, if the cord is off, may be given at the end of the second week.
3. The cord dressing should be changed, if soiled or moist. A dry sterile gauze dressing should be used until the stump is fully healed (this is usually from 7 to 10 days).
4. The eyelids should be washed off daily with sterile boric acid solution. Great care should be taken not to irritate or injure the eyes in any way. Signs of inflammation or a purulent discharge should be reported to the physician immediately.
5. The bowels must move freely. If the infant is constipated, a dose of castor oil should be prescribed. The

C. The daily care—Continued.

buttocks should be washed with cool water and a piece of gauze after the stool. A sponge should not be permitted for this purpose, as it is uncleanly.

6. The genitals should be cleansed daily with clean water and absorbent cotton. The foreskin in a boy should be completely retracted. The urination should be noted. If the child does not urinate, or the foreskin is tight or overlong, the physician's attention should be called to it. Red sediment (uric acid) on the diaper is a sign that more water should be given. (See Section II, Outline 5, Topic III, C, 2.)
7. Nursing. (See Section I, Outline 7.)
   (*a*) The baby is first put to the breast after the mother has rested and slept, usually from 8 to 12 hours after delivery. Not more than two feedings should be attempted the first day. (These may be omitted if the mother is prostrated.) After this the baby should be put to the breast every four hours (at 6, 10, 2, and 6 o'clock). (See Section I, Outline 7, Topic XI.)
   (*b*) If three-hour intervals are preferred, after the milk comes in, the interval is shortened and the baby fed at 6, 9, 12, 3, and 6 o'clock in the daytime, and at 10 and 2 o'clock at night.
   (*c*) The infant's mouth should not be washed, but the nipple should be washed carefully before and after nursing.
   (*d*) Nursing should last from 5 to 15 minutes, according to the way the milk runs and child draws.
   (*e*) The child must not sleep on the breast, or sleep with a bottle or pacifier (empty nipple) in its mouth.
8. Other food.
   (*a*) No other food is needed the first few days, but 1 ounce of water (boiled) should be given every two to three hours.
   (*b*) If the milk does not come in, or is very scanty at first, the child should be put on a very weak milk mixture to tide over until breast feeding is established.
   (*c*) Artificial feeding or a wet nurse should only be resorted to after every effort has been made to stimulate the mother's breasts to secrete. (See Section I, Outline 7, Topic VII.)

C. The daily care—Continued.

8. Other food—Continued.

(*d*) Water may be given between feedings, if the child is wakeful, but ordinarily not more than a few ounces in 24 hours. (See Section I, Outline 7, Topic XI, F, 4.)

9. Weighing and measuring.

(*a*) Every infant should be weighed and measured at birth and the figures recorded.

(*b*) The infant should be weighed every day before the bath until the food is established and gain seems permanent; after this it should be weighed once a week.

(*c*) If the child is not gaining or seems dissatisfied with the nursing, he should be weighed in his clothes before and after a feeding once or twice a day to see exactly how much he takes from the breast.

10. Sleep.

(*a*) A small infant should sleep most of the time (whenever he is not eating or crying), or from 18 to 20 hours out of the 24.

(*b*) He should sleep in a bed by himself.

11. Habits. (See Section II, Outline 5, Topic III, F.)

(*a*) A child is born with no habits. It rests with the nurse and with the mother to teach him the proper time to sleep, eat, be awake, and so to establish good habits.

(*b*) Gently insisting on the establishment of a routine in the early weeks means a well-trained child later.

12. General care.

(*a*) The temperature, pulse, and respiration should be noted daily.

(*b*) The room may be light, but not glaring.

(*c*) The temperature of the room should be 72° F., but fresh air must be freely admitted.

(*d*) Attention should be paid to the infant's hands and feet. They should be warm, otherwise a hot-water bag must be kept near.

(*e*) Visitors should be few, and no one but the nurse should handle the baby.

(*f*) Lifting and handling should be carefully done, as a newborn infant is very sensitive to shock.

READING REFERENCES V.

De Lee, cited above, pp. 70–73; 145–149; 169–186.
West, cited above, pp. 30–31.

VI. LEGAL PROTECTION OF NURSING MOTHERS.

(See Section III, Outline 7.)

A. International measures prohibiting the employment of women during the six weeks following confinement were recommended at the International Labor Conference at Washington in 1919.

B. The employment of women in industrial concerns for four weeks after childbirth is prohibited in four States and for three weeks after childbirth in one State of the United States.

C. Industries employing women should allow nursing mothers time to feed their babies and provide nursing rooms.

D. Measures should be advocated and made general to provide an adequate family income, so that nursing mothers can stay at home during the entire period of infancy and not be forced to enter industry.

READING REFERENCES VI.

Draft Convention and Recommendations: International Labor Conference, Government Printing Office, Washington, 1919.
Labor Legislation of 1914, U. S. Bureau of Labor Statistics, Bulletin No. 148, 1914, pp. 424, 1000, 1513, 2145.
Labor Legislation of 1918, U. S. Bureau of Labor Statistics, Bulletin No. 257, 1919, p. 168.
"Review of labor legislation of 1919," *in* American Labor Legislation Review, vol. 9, December, 1919, p. 444.
Standards of Child Welfare, U. S. Children's Bureau, Publication No. 60, 1919.

OUTLINE 7. THE NURSING PERIOD.

It is a well-known fact that for a short period at least a young mammal must have milk and can not thrive on an adult diet. Moreover, the taking of any food other than mother's milk by the young of the species means the ingesting of a substance foreign to the growth needs of the offspring and to its digestive capacity. It is now generally conceded that the chief difficulty met with in breast feeding is the production of enough milk to nourish the baby. Milk production is of course dependent on the health, food, and general hygienic care the mother receives, but the proper stimulation of the breast tissue from regular emptying of the breast is also a very important factor. The importance of breast feeding the infant, both to insure normal development and to furnish protection from disease, is little appreciated. There is nothing "just as good" as mother's milk.

I. THE FUNCTION OF LACTATION.

A. Lactation is the mechanism existing in mammals for the production of a food specifically adapted to the needs of the young of the same kind.

B. The capacity to produce milk in the mother depends on—

1. An inherited milk-producing tendency. (This is best exemplified in Holstein cows.)
2. The amount of food taken.
3. The amount of protein in the diet.
4. The kinds of protein. (Animal protein, especially milk, is far more efficient than vegetable protein.)
5. The capacity to digest and assimilate food.

READING REFERENCES I.

HOOBLER, B. RAYMOND: "The effect on human milk production of diets containing various forms and quantities of protein," *in* American Journal of Diseases of Children, vol. 14, August, 1917, pp. 105–112.

MCCOLLUM, E. V., *and* SIMMONDS, N.: The Nursing Mother as a Factor of Safety in the Nutrition of the Young, reprinted from the American Journal of Physiology, vol. 46, 1918, pp. 275–313, Biochemical Laboratory, School of Hygiene and Public Health, Johns Hopkins University, Baltimore.

II. THE MAMMARY GLAND.

A. Anatomy. (See De Lee, pp. 35–36; 52.)

B. Changes during pregnancy.

1. Body change. (See Section I, Outline 3, Topic III.)
2. Changes in the glandular tissue itself.
   - (*a*) It increases in size and fullness.
   - (*b*) There is an increase in pigmentation around the nipple.
   - (*c*) The nipple enlarges and becomes erectile.
   - (*d*) A slight yellowish secretion (colostrum) appears.

C. Relation of the health and care of the expectant mother to lactation. (See Section I, Outline 3, Topic III.)

D. Care of breast and nipples during pregnancy. (See Section I, Outline 3, Topic IV.)

E. Function.

1. Milk protein is elaborated from the products of the digestion of food proteins. (Animal protein is far more efficient for transformation into milk than vegetable protein.)
2. This is done by a selective absorption and a reconstitution of the amino-acids from the blood into complex proteins capable of producing tissue growth.

E. Function—Continued.

3. The accessory dietary substances or vitamines furnished by the food are concentrated from the blood, but are not synthetically produced in the body.
4. When the mineral elements in the food are too low to admit of growth in the young, the mineral supply of the mother is drawn on to furnish a more satisfactory inorganic food supply than she herself receives. (This ability of the mother to protect the growth of the young is necessarily limited in duration.)

READING REFERENCES II.

De Lee, Joseph B.: Obstetrics for Nurses, W. B. Saunders Co., Philadelphia, 1918, pp. 91–92.

McCollum, cited above, pp. 290–292.

West, Mrs. Max: Prenatal Care, U. S. Children's Bureau, Publication No. 4, 1915, p. 14; 32–33.

III. ESTABLISHMENT OF LACTATION.

A. A secretion called colostrum is present in the breast at birth.
   (*a*) This is a thick yellow fluid which coagulates on boiling.
   (*b*) Its action is slightly cathartic.
   (*c*) The flow begins on the second day after delivery.
   (*d*) For its chemical composition see Table III.

B. It changes from colostrum to a permanent secretion.
   (*a*) The change is gradual, lasting usually a week.
   (*b*) The milk becomes thinner and bluer in appearance.
   (*c*) Its composition becomes stable after the first month, and no regular changes are seen until near the end of lactation.

Table III.—*Composition of woman's milk.*[1]

A. PERCENTAGE COMPOSITION BY PERIODS.

Period.	Number of analyses.	Fat.	Sugar.	Protein.	Casein.	Albumin.	Ash.	Total solids.
Colostrum (1 to 12 days)	5	2.83	7.59	2.25	.....	.....	.3077	13.42
Transition (12 to 30 days)	6	4.37	7.74	1.56	.....	.....	.2497	13.39
Mature (1 to 9 months)	17	3.26	7.50	1.15	0.43	0.72	.2052	12.16
Late (10 to 20 months)	10	3.16	7.47	1.07	.32	.75	.1978	12.18

[1] Holt, L. Emmett, Courtney, Angelia M., and Fales, Helen L.: "A chemical study of woman's milk, especially its inorganic constituents," in American Journal of Diseases of Children, vol. 10, October, 1915, pp. 239, 243, 245.

TABLE III.—*Composition of woman's milk*—Continued.

B. AVERAGE DISTRIBUTION OF THE ASH FOR THE DIFFERENT PERIODS.

[Grams per 100 c. c. of milk.]

	Number of analyses.	Total ash.	CaO.	MgO.	P_2O_5.	Na_2O.	K_2O	Cl.
Colostrum (1 to 12 days)	5	0.3077	0.0446	0.0101	0.0410	0.0453	0.0938	0.0568
Transition (12 to 30 days)	6	.2407	.0409	.0057	.0404	.0255	.0709	.0580
Early mature (1 to 4 months)	9	.2056	.0486	.0082	.0342	.0154	.0539	.0351
Middle mature (4 to 9 months)	8	.2069	.0458	.0074	.0345	.0132	.0609	.0358
Late milk (10 to 20 months)	10	.1978	.0390	.0070	.0304	.0195	.0575	.0442

C. AVERAGE PERCENTAGE COMPOSITION OF ASH FOR THE DIFFERENT PERIODS.

	CaO.	MgO.	P_2O_5.	Na_2O.	K_2O.	Cl.
Colostrum	14.2	3.5	12.5	13.7	28.1	20.6
Transition	17.0	2.4	16.9	10.9	30.8	22.9
Mature	23.3	3.7	16.6	7.2	28.3	16.5
Late	19.8	3.6	15.5	10.1	28.8	22.3

IV. WOMAN'S MILK.

A. Physical character.

1. It is a bluish white fluid with a sweetish taste.
2. Its specific gravity averages 1.031.
3. Its reaction is alkaline, or amphoteric.
4. Microscopically, it is made up largely of fat globules.

B. Chemical composition. (See Table III.)

C. Variety and percentage of minerals in ash. (See Table III.)

D. Average daily secretion of breast milk. (See Table IV.)

(*a*) For the average daily number of calories of milk taken by the normal breast-fed infant, see Section II, Outline 2, Topic III, C.

TABLE IV.—*Average daily amount of milk secreted.*[1]

Time.	Quantity, ounces (approximately).
At the end of the first week	10 to 16
During the second week	13 to 18
During the third week	14 to 24
During the fourth week	16 to 26
From the fifth to the thirteenth week	20 to 34
From the fourth to the sixth month	24 to 38
From the sixth to the ninth month	30 to 40

[1] Holt, L. Emmett, and Howland, John: The Diseases of Infancy and Childhood, D. Appleton & Co., New York, 1919, p. 136.

(*b*) The amount of milk varies especially with the milk producing capacity of the mother, the food and water intake of the mother, and with the vigor with which the child empties the breast.

E. Duration of lactation.
   (*a*) The period of nursing is usually under one year.
   (*b*) In professional wet nurses and among certain people, it is often from two to three years or even longer.

READING REFERENCES III AND IV.

GRULEE, CLIFFORD G.: Infant Feeding, 3d ed., W. B. Saunders Co., Philadelphia, 1917, pp. 80–87.
HOLT *and* HOWLAND, cited above, pp. 134–141.

V. HYGIENE OF THE NURSING MOTHER.

A. Diet.
   1. The mother should have abundant regular meals. (From three to four meals should be taken in 24 hours.)
   2. She should take daily from one-third to one-half more calories than she requires normally under the same living conditions. (See Rose.) The nursing mother needs as much food as a laboring man doing heavy manual work.)
   3. Eating between meals is not necessary and is apt to upset the digestion.
   4. Special attention must be paid to increasing the animal protein, minerals, especially calcium and iron, and vitamine content of her food. (See Rose.)
   5. Milk or gruels made with milk should be given at bedtime (the fourth meal) and should be included in other meals. (Milk is the best milk producer.)
   6. An abundance of fluid is essential to the quantity of milk secreted. At least two glasses of water should be taken between meals.
   7. Indigestible foods should be avoided.
B. The bowels should be regulated by food, if possible.
C. Sufficient sleep and rest should be taken. (At least eight hours of sleep at night and a nap during the day are necessary.)
D. Attention should be given to cleanliness. (A daily bath is essential.)
E. Suitable exercise, outdoor airing, and recreation should be taken.
F. The cultivation of a calm, happy spirit is necessary for the benefit of the child.

VI. TECHNIC OF NURSING.

A. The nipple and adjacent breast tissue should be washed carefully before and after nursing with a solution of boric acid.
B. Between nursings, the nipples must be covered with a freshly ironed piece of linen, or sterile gauze.
C. Sore nipples may be covered after nursing with sterile albolene.

D. Position while nursing.
   1. If the mother is recumbent (which is a good means of getting needed rest), the infant should lie by her side, and the breast should be held away from his nostrils by her hand.
   2. If the mother is sitting up, the infant should lie on her knees, his head supported by her forearm. Her knee on this side should be slightly elevated by using a stool under her foot. The breast is then pendulous and the infant can breathe freely while sucking.

E. The breasts are usually alternated, but both may be used at one nursing, if the secretion is slight.

F. The infant should nurse from 5 to 20 minutes according to its size, vigor, and digestive capacity, and the abundance of the secretion.

READING REFERENCES V AND VI.

Grulee, cited above, pp 90–91; 96°97.

Holt *and* Howland, cited above, pp. 169–170.

Infant Care (Revised), U. S. Children's Bureau, Publication No. 8, 1921, pp. 47–52.

Rose, Mary Swartz: Feeding the Family, The Macmillan Co., New York, 1916, pp. 93–96.

West, Mrs. Max: Prenatal Care, cited above, pp. 32–35.

VII. DIFFICULTIES MET WITH IN BREAST FEEDING.

A. The quality of the milk ordinarily can be modified only slightly, if the food of the mother is adequate. (The psychic condition of the mother is, however, an important factor in the secretion of milk in some instances.) (See Topic VIII, B.)

B. The quantity of the milk can be increased by the amount of diet and the high content of animal protein, and by the amount of fluid taken.

C. Not infrequently, the milk flow is not established at the beginning of lactation, because the breasts are not properly stimulated, or emptied at regular intervals. (This is apt to be true, if the infant is small and weak at birth.)
   1. By regularly and completely emptying the breasts, it has been found possible to increase or reinstitute the flow of milk, even when several weeks without nursing have elapsed.
   2. If the child is unable to empty the breasts, the milk should be expressed by grasping the breast from ½ to 1 inch back of the colored areola, and by carrying a milking motion toward the nipple, but without massage. This should be done at first from 5 to 6 times daily. (See Sedgwick.)

C. Not infrequently, the milk flow is not established, etc.—Continued.
   3. The milk may be thus fed to the infant, and the milk can be kept up by this method, until the child is able to empty the breast himself. (See Sedgwick.)

D. Symptoms of unsuccessful breast feeding.
   1. No gain, or loss of weight, after the first initial loss in weight.
   2. Symptoms of acute indigestion, vomiting, diarrhea, etc.
   3. Nervous symptoms such as irritability, crying, restlessness, sleeplessness.
   4. Lack of vigor shown by pallor, apathy, and listlessness.

E. Breast milk, especially during the first weeks, may disagree with the infant or be too scant in amount. Before weaning, an attempt should be made to adapt the milk to the infant.
   1. By weighing the infant before and after each feeding to see how much food is really taken.
   2. By improving the character of the milk, by attention to the diet, general hygiene, and emotional state of the mother.
   3. By giving from ½ to 1 ounce of boiled water, or thin cereal water before nursing.
   4. By shortening the time of nursing, or lengthening the interval between nursings.

F. Hare lip or cleft palate may prevent nursing. The milk should be expressed from the breast and the infant fed by a dropper or Breck feeder.

VIII. CONDITIONS CAUSING DISTURBANCE OF LACTATION.

A. First or early resumption of family duties, work, or pleasures after puerperium.

B. Fits of anger, depression, or overexcitement in mother. Worry is especially likely to affect the milk.
   1. The nervous condition of the mother affects not only the quantity of the milk, but its quality and digestibility.
   2. Such milk is usually low in fat and high in protein content.
   3. "The infant may be so profoundly affected as to suggest the development of toxic substances." (See Holt and Howland, p. 144.)

C. Menstruation.
   1. Preceding the menstrual flow, the infant may show slight digestive disturbances and not gain in weight.
   2. Menstruation occurs within six months in probably one-half of all nursing mothers, and is in itself no reason for weaning.
   3. The weight of the child should, however, be carefully watched.

D. Pregnancy.
   1. This is usually an indication for weaning.
E. Acute illness.
F. Unusual or excessive exercise.

READING REFERENCES VII AND VIII.

Breast Feeding. U. S. Children's Bureau, Publication No. 83, 1921.
Grulee, cited above, pp. 89–92, 100.
Holt *and* Howland, cited above, pp. 141–144; 167–168.
Sedgwick, J. P: "Establishment, maintenance, and reinstitution of breast feeding," *in* Journal of American Medical Association, vol. 64, August, 1917, p. 417.

IX. THE FEEDING INTERVAL.

A. Feeding intervals in use at the present time.
   1. The four-hour interval with five feedings in 24 hours after the first month.
   2. The three-hour interval with seven feedings in 24 hours. These should be reduced to six feedings after the early months.
   3. The two-hour interval was much used in the past. It is seldom advocated now by physicians, although it is still used by ignorant mothers.
B. Relative merits of different intervals.
   1. The stomach of the infant does not empty before three hours, or over.
   2. Either the three- or four-hour interval suffices for the average breast-fed baby.
   3. Artificially fed children usually do better on a four-hour interval.
   4. By the fifth month of life, all babies should be on a four-hour interval.
   5. In indigestion, colic, etc., the four-hour interval is preferable, as the stomach is more surely emptied between feedings.
   6. The longer the interval, the greater the freedom and the ability of the mother to get proper rest and recreation.
   7. In using the four-hour interval, the infant necessarily must take more milk in order to be satisfied for the longer period. If the milk supply is scant, or the infant feeds poorly, this may not be accomplished. Often this empties the breast more effectually and stimulates greater milk production.

READING REFERENCES IX.

Grulee, cited above, pp. 98–99; 156.
Holt *and* Howland, cited above, pp. 170–171.

X. AMOUNT OF MILK TAKEN AT A SINGLE FEEDING AND TOTAL 24-HOUR AMOUNT.

TABLE V.—*Amount of milk taken at a single feeding and total 24-hour amount according to age of infant.*

Age.	Average intake at a single feeding.	Total 24-hour amount.
	Ounces.	*Ounces.*
1 to 3 days	½	Varies.
1 week	1–2	8–10
1 month	2½–3½	19–25
3 months	4–5	25–27
6 months	6–7	32–35
8 months	8	40

A. Individual infants vary greatly in the amount of food taken; usually larger infants take not only more milk but more in proportion to their body weight than smaller infants of the same age. Active infants require more food than quiet infants of the same weight. (See Section II, Outline 2, Topic III, B.)

B. Ordinarily a breast-fed child is allowed to take all the milk he desires from the mother in the usual length of nursing, unless he shows by regurgitation or indigestion that he is being overfed.

C. When desired, the amount of intake of any infant can be determined by weighing him several times a day before and after feeding.

READING REFERENCES X.

GRULEE, cited above, pp. 97–98.

TALBOT, FRITZ: "Caloric requirement of normal infants and children from birth to puberty," *in* American Journal of Diseases of Children, vol. 18, October, 1919, pp. 229–237.

XI. NURSING ROUTINE.

A. Either the three- or four-hour interval may be started.

B. The number of feedings in 24 hours.

1. With the three-hour interval seven are sufficient, even the first month; after this, six feedings. The three-hour interval should be abandoned for the four-hour interval by the fifth month.
2. With the four-hour interval, six feedings may be given the first month; after that five should be sufficient. (The night feeding may be given up at any time the infant will sleep all night without awakening.)

C. The nursing hours.

1. It is immaterial at what hour the infant starts the day. The comfort and convenience of the mother should settle this point.
2. Nursing usually begins at 6 or 7 a. m.

D. The length of nursing.

1. Usually from 5 to 20 minutes, not longer. "In the first 5 minutes the child gets as much as in the next 10." (Grulee.)
2. Child must not play or sleep when nursing.

E. Daily schedule for breast feeding. (See Table VI.)

TABLE VI.—*Daily schedule for breast feeding according to age of infant.*

Age.	Number of nursings in 24 hours.	Interval during day (hours).	Number of night nursings, 6 p. m. to 6 a. m.
1 day	2	12	None.
2 days	5	4	1
3 days to 1 month	6–7	4 or 3	2
1 to 3 months	5–6 or 7	4 or 3	1 or 2
3 to 5 months	5–6	4 or 3	1
After 5 months	5	4 only.	1

F. Supplementary feeding.

1. One artificial feeding a day may be substituted for a breast feeding after the third or fourth month, if the mother is intelligent and cleanly enough to be trusted with the preparation of the food.
2. Part breast and part bottle at the same feeding is often better, especially if more than one bottle is given. Breast milk is apt to fail if the child nurses only at infrequent intervals.
3. The supplementary bottle feeding is an advantage, as it enables the mother to have a long period of rest, prolongs the nursing period, teaches the infant to take artificial food, and makes weaning easy at any time.
4. Warm, boiled water in small quantities according to the age of the child may be given between nursings. Infants should be offered water at least twice a day to encourage the habit of using a bottle as well as to insure a sufficient intake of liquid. From 1 to 2 ounces a day, during the early months, to from 4 to 8 ounces, during the later months of the first year, is sufficient. ("Water tippling," or sleeping with a nipple in the mouth, should not be allowed.)
5. Fruit juice may be given any time after the third month to a breast-fed child. After the first six months this addition to the diet should be considered a necessity.
   (*a*) Orange juice, which contains a considerable amount of iron and calcium, and the water soluble vitamines, especially the antiscorbutic vit-

F. Supplementary feeding—Continued.

amine, is the form of fruit juice usually given. (See Section II, Outline 2, Topic IV, D. E.; Outline 5, Topic II, B, 4; also Section II, Outline 4, Topic VI, B.)

(*b*) Orange juice should be—

(1) Gradually increased from 1 teaspoonful to 1 ounce.

(2) Always strained.

(3) Given on an empty stomach.

(4) Given usually from 20 to 30 minutes before nursing.

(5) Diluted with an equal amount of water.

XII. WEANING.

A. Ordinarily infants do better when weaned by the ninth month. Nursing may be prolonged—

1. At the onset of, or during, the hot season.
2. If the infant is recovering from an illness, or from digestive disturbance.
3. If the infant is unable to digest cow's milk.
4. In case of extreme poverty of family.

B. Additional food should be given to a nursing infant during the second six months, or he may show nutritional disturbances, such as rickets. (See Section II, Outline 4, Topics VI, B; IX, A.)

C. Weaning, if possible, should be gradual.

D. Infants accustomed to taking water or food from the nursing bottle can, as a rule, be easily weaned. Infants who have not learned to use a nipple may refuse to take food from the bottle or be induced to do so only after a prolonged struggle.

E. One bottle a day of properly prepared artificial food suited to the age, size, and digestive capacity of the infant should be given at first.

F. Part breast and part bottle may be given at one or more feedings. Mixed feedings seldom upset the digestion.

G. A second and third bottle should be gradually substituted for a breast feeding; then, if digestion is undisturbed, breast feeding should be stopped entirely.

H. When nursing is stopped, the mother should—

1. Limit fluid intake.
2. Keep the bowels open.
3. Leave the breasts alone, in spite of some unavoidable discomfort. (Pumping the breasts only prolongs the secretion.)

I. The milk will usually disappear from the breasts within a few days, if the breasts are not stimulated.

READING REFERENCES XI AND XII.

GRULEE, cited above, pp. 101–104.
HOLT, cited above, pp. 177–179.
Infant Care (Revised), cited above, pp. 58–59.

XIII. RELATIVE MORTALITY AMONG BREAST AND BOTTLE FED BABIES.

A. The mortality among infants artificially fed is higher than that among breast-fed infants, at least during the first six months. (See Section I, Outline 1, Topic VIII.)

B. Recent studies have shown that the death rates for artificially fed infants are three to five times those for breast-fed infants, the rate varying according to hygienic, economic, and industrial conditions. In one large city studied the monthly death rates for the artificially fed were from three to nine times those for breast-fed infants. The death rate for the group of infants with mixed feeding lay midway between the rate for the other groups; for the first month it was nearly equal to the rate for those artificially fed, but for the later months, it approximated more closely the rate for breast-fed infants. (See Woodbury, p. 38.)

C. In certain other investigations, breast-fed infants have been found to have a lower morbidity rate as well as a lower mortality rate than bottle-fed infants. They are apparently less susceptible to disease, with the exception of tuberculosis and influenza, and are better able to resist infection and to stand disease with less injury. In one study, only 51 per cent of a group of breast-fed children, as against 97 per cent of bottle-fed children, had diseases during a two-year period. (See McClanahan.)

READING REFERENCES XIII.

Breast Feeding, U. S. Children's Bureau, Publication No. 83, 1921.
DAVIS, WILLIAM: Statistical Comparison of the Mortality of Breast-fed and Bottle-fed Infants, Printing Department, Boston, 1912.
MCCLANAHAN, H. M.: "The relative morbidity of breast-fed and bottle-fed infants," *in* Archives of Pediatrics, vol. 35, November, 1918, pp. 653–660.
WOODBURY, ROBERT M.: "Infant mortality studies of the Children's Bureau," in Quarterly Publications of American Statistical Association, Boston, June, 1918, pp. 38–40.
See also Infant mortality studies referred to in Outline I.

OUTLINE 8. THE CARE OF THE INFANT.

It has been aptly said that the mother is the child's environment. In a sense this is true, but the influence of good home surroundings

on the future health and happiness of the child must not be forgotten. A mother's first duty is to know what is important in the care of the baby and to carry out faithfully and intelligently this knowledge in the details of his daily life. Fresh air, sleep, food, cleanliness, play, and exercise are all of vital importance in the normal development of the young. The mother is responsible for planning the daily routine of the child so that each physiologic need may be properly met and for training the child to conform to this routine. The habits formed in early life are the ones that last.

I. THE HOME SURROUNDINGS.

A. Relative merits of—
   1. Detached house.
   2. Semidetached house.
   3. Attached house.
   4. Two- and three-family apartment house.
   5. Multiple flat house.

B. Essentials in the choice of the house.
   1. Decent neighborhood and surroundings.
   2. Individual yard, sufficiently large for active play.
   3. Sunny exposure.
   4. Windows on as many sides as possible.
   5. Rooms adequate in number to size of family. (The parents and children of each sex should have separate bedrooms.)
   6. Rooms good sized and individually well lighted and ventilated.
   7. Porch (especially necessary in an apartment).
   8. Fireplace for ventilation, additional heat, and comfort.
   9. Running water, inside toilet, and bath. Separate toilet facilities for each family in a flat house.
   10. Modern sanitation, including complete plumbing, if possible.
   11. Thorough cleaning, repainting, and repapering of previously occupied houses.

READING REFERENCE I.

See Section III, Outline 6.

II. THE NURSERY.

Toy models of the nursery and equipment should be used to demonstrate proper arrangement for hygiene, comfort, and efficiency, if a real nursery is not available.

A. A large room is desirable, as it serves for combination sleeping and living room.

B. A sunny, corner room should be used, if possible.
C. Quiet is desirable, though an infant should be accustomed to ordinary family noise.
D. Convenience to bathroom and mother's room should be considered.
E. Windows.
    1. At least two.
    2. On different sides of room.
    3. Light and dark shades, if no window blinds.
    4. Screens against insects.
    5. Wash curtains (no other draperies).
    6. Window boards, or ventilators in sash.
    7. Window bars, or other protection.
F. Walls.
    1. Neutral color, washable paint.
    2. Freshly papered.
    3. Oilcloth wall covering.
G. Floors.
    1. Painted.
    2. Covered with linoleum.
    3. Hard wood and varnished.
    4. Wash rugs, preferably small size as they are more easily cleaned.
H. Heating.
    1. Steam or hot water heating gives the most certain and uniform heat, but reduces the humidity of the room.
    2. Hot-air furnace or fireplace provides ventilation, gives quick heat for a short period of time, and can be adapted to easy methods for increasing the humidity.
    3. Stoves, either coal or wood, use up the oxygen in the room, even if no gases are given off. Gas or kerosene stoves are to be avoided for nursery, if possible, because of the danger connected with their use.
    4. All fires and dangerous lights should be adequately protected by wire screens.
I. Temperature.
    1. A thermometer should hang about 30 inches from the floor.
    2. A desirable temperature of the room, according to the age and vitality of the infant: Day, from 65° to 68°; night, from 60° to 40°, or lower.
J. Daily care.
    1. The baby should be removed to another room, and the windows opened wide.

J. Daily care—Continued.

2. The bedclothes should be aired. Wet diapers or night clothes should not be dried in the nursery.
3. The floor, woodwork, and furniture should be wiped with a damp cloth.
4. The rugs should be removed from the room to be cleaned, or a vacuum cleaner used in the room.
5. No sweeping or dry dusting should be done in the room.

III. NURSERY FURNITURE.

All unnecessary articles, unwashable covers, or frills should be avoided.

A. Bed.

1. Every child should sleep alone.
2. For the first bed a large, flat clothes basket, bassinet (not on rockers or swinging), or regulation crib (metal preferred to wood) may be used.
3. A folded heavy woolen blanket or heavy table felting makes a good mattress for the basket or bassinet, and one that is easily aired or washed.
4. The crib should have woven-wire springs and a hair or cotton-felt mattress.
5. Bedclothes.
   - (*a*) Rubber sheet large enough to cover mattress.
   - (*b*) Quilted pad.
   - (*c*) Cambric or muslin undersheet large enough to tuck in well.
   - (*d*) No top sheet necessary during the early months, if a blanket-bag is used.
   - (*e*) Several soft woolen shawls.
   - (*f*) Wool comfort or woolen blanket, crib size.

B. Bed or couch for the mother or nurse, if she sleeps in the same room with the child.

C. Chest of drawers, bureau, or other convenience for holding clothes.

D. Bathing arrangements. (See Topic IV, B.)

E. Low chairs, one with and one without arms.

F. Little chair and table for infant's use.

G. Platform scales (beam not dial) with flat basket, pan, or scoop.

H. Table for holding scales.

I. High table, padded for dressing the baby (optional).

J. Covered enamel-ware pail for diapers. (This should be kept out of the room.)
K. Nursery chair (kept in bathroom).
L. Hamper for soiled clothing (kept in bathroom).

READING REFERENCES II AND III.

Holt, L. Emmett, *and* Howland, John: Diseases of Infancy and Childhood, D. Appleton & Co., 1919, pp. 9–10.
Infant Care (revised), U. S. Children's Bureau, Publication No. 8, 1921, pp. 12–17.
Kenyon, Josephine Hemenway: Simple Lessons on the Physical Care of the Baby, Teachers College, Columbia University, Technical Education Bulletin No. 31, 1917, pp. 3–5.
Sadler, William S., *and* Lena K.: The Mother and Her Child, A. C. McClurg & Co., Chicago, 1916, pp. 114–122.

IV. BATHING.

(See Section I, Outline 6, Topic V.)

A. Room for bath.
   1. The family bathroom may be used or the child may be bathed in a portable tub in the nursery, or in any other warm room.
   2. The temperature of the room should be from 70 to 75 degrees F., not warmer.

B. Equipment.
   1. Tub.
      (*a*) Baby's oval bathtub.
      (*b*) Small foot tub.
      (*c*) Large, granite-ware basin.
      (*d*) Collapsible rubber tub (expensive).
      (*e*) Wooden frame covered with oilcloth or rubber cloth.
   2. Table or box to stand tub on.
      (*a*) Placing baby's bathtub on a box or frame in the family bathtub does away with the carrying of water to fill or empty the tub.
   3. Tray of enamel ware on which is kept, in covered china or glass jars, all toilet articles, such as—
      (*a*) Absorbent cotton.
      (*b*) Toothpicks.
      (*c*) Boracic acid solution.
      (*d*) Safety pins (three sizes).
      (*e*) Soap (Castile).
      (*f*) Squares of gauze or old linen.
      (*g*) Talcum powder.
      (*h*) Tube of vaseline, albolene, or cold cream.
      (*i*) Soft baby brush or comb.

B. Equipment—Continued.

4. Towels, etc.
   (*a*) Individual towels and wash cloths.
   (*b*) Six soft linen towels (bird's-eye linen makes good, soft towels).
   (*c*) Six cheesecloth or mosquito netting wash cloths.
   (*d*) Bath apron, butcher style, outing flannel.
   (*e*) Bath towel for mother's lap or dressing table.
5. Bath hour.
   (*a*) The bath must be given on an empty stomach, preferably in the morning.
   (*b*) A convenient time is just before the midmorning feeding (this insures a good nap).
   (*c*) A half hour should be allowed for the entire bath, including undressing and dressing.
6. The temperature of the bath water should be taken by a bath thermometer.
   (*a*) During the early weeks the temperature should be from 98° to 100° F. (warm).
   (*b*) During the first six months it should be from 95° to 90° F. (tepid).
   (*c*) During the next six months it may be down to 80° F. (cool).
   (*d*) A cold splash over chest, 65° F., may be given after the first months.
7. Technic of the bath. (See Infant Care (Revised), pp. 23–26.)
8. The teeth should receive daily attention as soon as cut. The mouth of an infant should not be washed.

READING REFERENCES IV.

Holt, cited above, p. 2.
Infant Care (Revised), pp. 23–26, cited above.
Kenyon, cited above, pp. 10–12.

V. CLOTHING.

A. The object of clothing is to insure uniform body temperature, hence it must be easily adapted to changing conditions.

B. All clothing should allow free movement of arms and legs. (Infants should not be pinned down or confined long in one position.)

C. The baby must not be overloaded with clothing, during either the summer or winter (a properly clothed child has warm hands and feet but does not perspire).

D. Light or medium weight part-wool underclothing, shirt, band, and stockings (or long booties) should be worn except in very warm weather.

E. Other indoor garments, flannel skirt and dress, or nightgown, should be light; a wrapper or shawl may be added, if needed.

F. Outdoor garments should suit the season. A blanket bag with or without a hood may be worn for outdoor sleeping or airing in cold weather.

G. For night wear, a sleeping bag of woolen blanketing or outing flannel may be used, according to the outside temperature.

H. At night, a young infant should wear the same number of garments as he does in the daytime, but the clothes should be changed at night. Night drawers should be provided for older infants; a young infant may sleep in a slip, nightgown, or wrapper.

I. The feet and hands should be protected from cold. In cool weather, loose stockings or long booties should be worn.

J. Moccasins or soft sole anklets may be used during the creeping period; leather sandals, or heelless button shoes, with soft soles, straight sides, and wide lasts may be used when walking begins.

K. All garments should be simple, without trimming of lace and frills. (Ornamentation by hand needlework is best from both esthetic and practical standpoints.)

L. The garments should not be starched.

M. Long clothes are a burden to the baby, as well as an unnecessary expense. The first dresses should not more than cover the feet (from 26 to 27 inches from the neck to the bottom of the hem).

N. Essentials in selecting materials.

1. Unwashable fabrics should not be used.
2. White is preferable to colored material; pink woolen washes better than blue.
3. Loosely woven fabrics allow the evaporation of moisture from the skin.
4. Fabrics should be chosen for durability and washing qualities as well as for fineness.
5. When the mother does the laundry work, fabrics needing little or no ironing should be selected.
6. Wool mixed with silk, linen, or cotton washes and lasts much better than all wool.

O. List of necessary clothes. (See Kenyon, pp. 5–7; Infant Care (Revised), pp. 17–23; also The Care of the Baby.)

P. Care of the garments.

1. The undergarments next to the skin should be changed at night, and complete fresh sets for both day and night should be put on frequently.

P. Care of the garments—Continued.

2. Other clothing should be changed when soiled or mussed.
3. All wet diapers should be washed in hot water and rinsed before using again. Soiled diapers must be washed in hot soap suds, thoroughly boiled and rinsed before using again. (The buttocks are easily irritated by the presence of ammonia, from the action of the stool or any soap left in the diaper.) Diapers should be dried outdoors, if possible. Ironing is not necessary.
4. Woolens should be washed by the cold process.

READING REFERENCES V.

The Care of the Baby, U. S. Children's Bureau, Dodger No. 9, 1919.

Holt *and* Howland, cited above, pp. 2–3.

Rucker, W. C., *and* Pierce, C. C.: The Summer Care of Infants, United States Public Health Service, Supplement No. 16, 1918, p. 9.

West, Mrs. Max: Child Care, Part I. The Preschool Age, U. S. Children's Bureau, Publication No. 30, 1918, p. 32.

VI. SLEEP.

A. A young infant should sleep from 16 to 20 hours out of the 24.

B. Training should be begun during the first weeks, to induce a long unbroken sleep interval at night (if possible, six hours), in preparation for sleeping through the entire night.

C. An infant must not turn night into day. To avoid this, it should be wakened to feed regularly in the daytime and should not be permitted to sleep in the late afternoon.

D. The long nap in early infancy usually comes in the morning after the bath and the midmorning feeding.

E. The short nap comes after the midday nursing and should not last into the late afternoon.

F. After the second nap is given up, it is better to have the nap taken after the noon feeding, as this relieves the mother at her midday meal.

G. A nap of from one to two hours should be continued throughout infancy until the child is 4 years of age, or older. Many subnormal children need a nap throughout childhood.

H. If possible, naps should be taken outdoors in a pen or carriage. For a nap indoors the room should be darkened and the windows opened as wide as the season permits. A sleeping bag, cap, and mittens should be worn in the winter in cold climates.

I. Moderate quiet should be enforced, but it is not necessary or desirable to suspend the ordinary family occupations to allow an infant to sleep.

J. A well-trained infant should go to sleep when put in bed, without being rocked, patted, or sung to sleep. If a well child is fed, diapered, and made comfortable, its fussing or crying may be ignored until it becomes accustomed to sleeping at a regular hour.

K. A child should not be wakened at night to be fed or diapered. In the daytime it should feed at the regular interval, and the diaper should be changed whenever it is wet. A child should not be wakened to have the diaper changed.

L. Broken, disturbed sleep accompanies any acute illness; it is common when the nasal passages are obstructed from adenoids or acute colds. It may occur with the irritation of indigestion, constipation, teething, or tight foreskin.

M. A child usually should lie on his face or on either side when sleeping, not on his back.

READING REFERENCES VI.

Holt, cited above, pp. 5–6.
Infant Care (Revised), cited above.
Kenyon, cited above, p. 8.

VII. FRESH AIR AND VENTILATION.

A. Plenty of fresh air day and night is as much a necessity for the human organism as food.

B. Ventilation depends on having a proper inlet and outlet for air. A window, open at the bottom (protected by a muslin window screen, or window board) allows free intake of outdoor air; a vertical flue in the wall, connected with the outside, or in the chimney near the ceiling, is the ideal outlet. Another window open at the top will give cross ventilation if there is no other outlet. (An open fireplace aids greatly in ventilation.)

C. A young child can be made sensitive to cold, and even have its body functions impaired, by being kept indoors too much or in a vitiated atmosphere.

D. In mild or summer weather an infant should be outdoors as many hours of the day as possible, and when indoors the room should be well ventilated.

E. There is danger in high indoor temperatures in summer.

F. In winter a well baby should take his nap outdoors or go out for an airing if the outdoor temperature is over 20° above zero.

G. Children under 2 years of age should not be out in temperatures under 20° above zero, as too much vitality is used up in maintaining normal body temperature. Melting snow and high winds are dangerous for young children.

H. The nursery should be aired several times a day and before bedtime during cold weather.

I. A well infant properly protected by blanket bag, sack, mittens, and cap can have a well-ventilated room at night when the temperature is above zero, F. (It is better to have a current of air in the room and artificial heat than to have no ventilation.)

READING REFERENCES VII.

ABT, ISAAC ARTHUR, *and* HESS, JULIUS HAYES: Keep Your Baby Well This Summer, American Medical Association, 535 North Dearborn Street, Chicago, pp. 7–9.

HOLT, cited above, pp. 27–30.

Infant Care (Revised), cited above.

SCHERESCHEWSKY, J. W.: Heat and Infant Mortality, U. S. Public Health Service, reprint No. 155, pp. 2602–2604.

VIII. PLAY AND EXERCISE.

A. An infant should not be pinned down or deprived of the free use of his arms and legs. (Crying and kicking are the baby's mode of exercise.)

B. Every young baby is better for being held for a short period once or twice a day, to insure a change of position.

C. Twice a day, usually after the bath and while undressing him for the night the mother should rub the child's body well and should encourage active play.

D. Voluntary exercise, rolling, kicking, creeping, etc., should be made possible by putting the infant early into a baby yard or pen. (This should be raised from the floor to avoid drafts.)

E. No special exercises are needed for the normal development of the infant.

READING REFERENCES VIII.

HOLT, cited above, pp. 7–8.

Infant Care (Revised), cited above.

KENYON, cited above, p. 10.

IX. FEEDING THE INFANT.

(See Section I, Outline 7; Section II, Outlines 2, 3, and 4.)

X. TRAINING OF RECTUM AND BLADDER.

A. Stool.

1. During the early months, an infant may be trained to pass a stool at a regular time by holding it over a warm chamber once or twice a day, usually after feeding.
2. An older infant should use a nursery chair.
3. A well-oiled paper spill, or soap suppository may be used to establish the habit of bowel movement at a regular time.
4. The suppository habit should be avoided.
5. An average child should be trained in this regard before the end of the first year; many are trained much earlier.

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B. Bladder.

1. A young baby passes urine very frequently (every hour or oftener). With an average child bladder control should be established (except at night) before the end of the second year.
2. Training the bladder is more difficult than training the rectum.
3. Infants have been trained as early as 3 months of age to go without a diaper, except at night.
4. The method is the same, as described for the stool.
5. It usually involves more time the first year than a busy mother can afford.

READING REFERENCES IX AND X.

Holt, cited above, pp. 4–5.
Infant Care (Revised), cited above.

XI. DAILY SCHEDULE.

A. A daily schedule should be planned for an infant the first six months, the second six months, and the third six months of life.

B. A working schedule should be planned for the same periods for the mother:

1. Doing all her own work.
2. Having outside assistance for a few hours each day.
3. Having a maid for general housework.

READING REFERENCES XI.

The Care of the Baby, cited above.
Kenyon, cited above, p. 9.
Infant Care (Revised), cited above.

XII. ESSENTIAL HEALTH HABITS TO BE ACQUIRED IN INFANCY.

The foundations for health should be laid in infancy. In training the child during the early months to sleep, eat, and to take fresh air and exercise regularly, and at the proper time, the mother promotes the normal development of the baby and the formation of proper habits. (See Section II, Outline 5, Topic III; Section III, Outline 2, Topic IV; also Section IV, Outline 3.)

THE DEVELOPMENT, GENERAL HYGIENE, AND FEEDING OF THE CHILD

SECTION II.—THE DEVELOPMENT, GENERAL HYGIENE, AND FEEDING OF THE CHILD.

OUTLINE 1. GROWTH AND PHYSICAL DEVELOPMENT OF THE AVERAGE HEALTHY CHILD.

The child's daily life is essentially different from that of the adult. These differences run parallel with very dissimilar bodily structures and functions. The child is not a miniature man. Almost every organ of the smaller being is different. Each organ of the child not only has a different absolute weight from the corresponding organ of the adult but also bears a different relative value to the whole body. As to the functioning, in the adult we see an organism in fairly constant physiologic equilibrium, while in the child this equilibrium is being continually disturbed by marked progressive changes which are called growth. An endeavor will be made to show what the chief structural and functional characteristics of childhood are and what implications they carry as to physiologic activities and habits.

I. ESSENTIAL NATURE OF GROWTH AND DEVELOPMENT.

A. Growth is the force inherent in a living organism, causing new conditions of existence and demanding continual readjustments on the part of the organism to meet them.

B. Certain manifestations of this force are differentiated as—

1. Organic growth, or the enlargement or increase in the amount of substance of a living organism or part of a living organism.
2. Physical development, or the progressive maturing of the body in structure and function.

C. Standards indicative of physiologic age. (See Topic VII, C, D, E.)

1. Growth.
   - (*a*) Height.
   - (*b*) Weight.
2. Physical development.
   - (*a*) Condition of ossification of bones, and degree of dentition.
   - (*b*) Relative proportions of various parts of body.
   - (*c*) Degree of sexual maturity.

D. Period of growth and development.
   1. In the child, the period is longer in proportion to the length of life than in other animals.
   2. The period includes approximately one-third of a lifetime.

II. FUNDAMENTAL PROCESSES UNDERLYING GROWTH.

A. Ingestion, or the act of taking nutritive materials into the body. In man this is accomplished by the alimentary tract and the lungs.

B. Metabolism, or those changes that occur in our foodstuffs from the time they are absorbed from the alimentary canal until they are eliminated in the excretions. On the one hand, the stable nonliving end-products of digestion are built up into complex and unstable living material; on the other hand, the living matter in protoplasm is broken down into less complex and more stable substances. These processes are called anabolism and katabolism.
   1. Anabolism is the building up of body tissue, either new tissue or broken-down tissue (tissue renewal).
   2. Katabolism is the breaking down of body tissue, chiefly through oxidation.

C. Elimination, or the act of getting rid of wastes through the skin, bowels, and other excretory organs.

III. FUNDAMENTAL PHYSIOLOGIC DIFFERENCES IN CHILD AND ADULT.

A. Body composition.
   1. Water content of child is higher than that of the adult. A relatively larger amount of fluids and liquid foods is required in infancy and childhood. (See Section II, Outline II, Topic IV, F.)
   2. Fat content of the new born is higher than that of the adult. The proportion of fat found later in the body varies with the age.
   3. Mineral content (part of skeletal material) is lower than that of adult. The flexibility of the child's bones and brittleness of the adult's bones is evidence of this.

B. Metabolism.
   1. Dependent in large part on oxidations in the body, metabolism takes place at a higher rate in the child than in the adult.
   2. The food requirement for the child, therefore, is proportionately larger (from 40 to 50 calories per pound in the infant as compared with from 20 to 25 calories per pound in the adult). (See Section II, Outline 2, Topic III.)

B. Metabolism—Continued.

3. The greater intensity of this metabolic rate is due mainly to—

(*a*) Greater heat loss by surface radiation in the child than in the adult.

(1) The smaller of two bodies of similar form has greater heat loss by radiation, because it has a relatively larger surface area.

(2) The surface area of the infant in relation to his weight is proportionately from two to three times greater than that of the adult. (For this reason the child, especially the infant, needs to be warmly covered in cold and even moderate weather.)

(3) A thin baby loses more heat in comparison to its weight than a fat baby, hence special precautions are necessary to keep his body warm. (The temperature-regulating mechanism of an infant is unstable and he has no protective covering comparable to the fur of an animal.

(*b*) Growth energy of childhood. (For the special food needs of the growing child see Section II, Outlines 2, 5, and 6.)

IV. PHENOMENA ASSOCIATED WITH GROWTH AND DEVELOPMENT.

A. Rate of growth decreases with age, varying directly with metabolism.

1. The greatest growth occurs during fetal life—from a microscopic ovum to 7 pounds.
2. An increase of 200 per cent occurs during first year of life—from 7 to 21 pounds.
3. An increase of 25 per cent occurs during the second year—from 21 to 26 or 27 pounds.
4. The rate of growth decreases until by the twenty-third year, at the latest, the child reaches full growth.

B. Periods of accelerated growth.

1. Early period.
   (*a*) From birth to the third or fourth years.
2. Later period. (See Section II, Outline 7.)
   (*a*) Begins shortly before and continues during adolescence—from the tenth or twelfth to the fifteenth

B. Periods of accelerated growth—Continued.
2. Later period—Continued.
or sixteenth year (slightly earlier in girls than boys).
(*b*) Teachers and parents are often surprised by rapid changes in temperament and general capability as well as in sudden growth at this time.
(*c*) Intelligent handling and feeding of the adolescent child is necessary to prevent overtaxing and to supply growth energy. (See Section II, Outline 6, Topic III; Section IV, Outline 5, Topic I.)

C. Physiologic resistance increases with age, varying indirectly with metabolism, and is therefore least in infancy.
1. To fatigue.
(*a*) Sleep and rest are of paramount importance to the child.
2. To bacterial and other toxins or poisons.
(*a*) The immunity of the newborn baby, which is the immunity transmitted through the mother, wears off during the first and second years. The child's own immunity does not become established until later, varying with the individual. The importance of protection from children's diseases in early childhood is evident. (See Section III, Outline 3, Topic II, C, 1.)

V. PHYSIOLOGIC FUNCTIONS AFFECTING INDIVIDUAL VARIATIONS IN GROWTH AND DEVELOPMENT.

Among the most important mechanisms regulating growth and development are the internal secretions of certain glands. The action of these is intricately interwoven, and their functions in some instances are still unknown. Only those secretions whose functions are the better understood are given here. Malfunctioning of the glands may produce serious conditions; as yet only a few disorders directly attributable to internal secretions are fully understood.

A. Thymus secretion in the child has some influence on growth and development, specially of the generative organs. It is negligible in the adult.

B. Thyroid secretion in the young child affects metabolism, mental development, and growth, particularly of the bones and generative organs; in the adult it influences general metabolism which is especially shown in the condition of the skin, hair, fat, and by the mental condition. Absence of the secretion results in a condition known as cretinism.

C. Parathyroid secretion affects calcium metabolism, and is thought to diminish the excitability of nerve cells.

D. Hypophysis, or pituitary body secretion, is interrelated with the internal secretions of other glands. It acts on growth processes, particularly of the bones, and also of the reproductive organs. The secretion from the posterior lobe raises the blood pressure in plain muscles and produces strong contractions of the uterus. It also influences carbohydrate storage in the body.

E. Pineal body secretion in a young child possibly has some influence, of an inhibitory nature, on the reproductive organs; it may be that it also affects metabolism. In the adult its action is probably negligible.

F. Adrenal secretion is supposed to influence the reproductive organs, probably in connection with other ductless glands, as the thyroid and pituitary body.

G. Intestinal gland secretion has a stimulating effect on the production of pancreatic juice and to a less degree on bile.

H. Pancreatic secretion produced by the cells of the islands of Langerhans affects sugar assimilation in the body. Defective sugar metabolism produced by the imperfect functioning of the pancreas is one cause of diabetes mellitus.

I. Reproductive gland secretions affect secondary sexual characteristics. The secretions from the "yellow bodies" (corpora lutea) in the ovaries have important functions in pregnancy. Lack of development of the sex glands, or sexual deficiency, results in the lack of appearance of secondary sexual characteristics, as well as in the incapacity to reproduce. (This result may be artificially produced by castration.)

VI. FUNDAMENTAL CHANGES IN SIZE AND PROPORTION OF CERTAIN PARTS OF THE BODY FROM INFANCY TO ADULT STAGE.

In general, the child has a relatively large abdomen and head, a relatively narrow chest, and short limbs, compared with the adult. In the infant, the midpoint of the body is at the navel; in the man, at the symphysis pubis. The weight of the body in early maturity is 20 times, or a little more, the weight at birth. All the internal organs, except the thymus and adrenals, increase in size with the development of the individual, though they are relatively smaller in the adult than in the child. The larger viscera, such as the liver, the heart, the kidneys, and the spleen, increase about 12 times in weight from birth to the adult stage. The stomach, parotid glands, and the pancreas show a greater increase. Of all the organs, the testis shows the greatest relative enlargement.

A. Internal organs.

1. Heart.

(*a*) At birth it is relatively larger than in the adult.

(*b*) The containing space, the relative and absolute positions, the outline, and the form of the heart of the child are very different from what they are in the adult.

2. Stomach. (See Section II, Outline 2, Topics I and II.)

(*a*) In infancy, the stomach is perpendicularly placed, and the fundus is very flat.

(*b*) It changes from tubular to pouch, or retort shape.

(*c*) Weight.

The weight increases from an average of 6.49 grams at birth to an average weight of 154.5 grams in the adult, or nearly twenty-four fold.

(1) By the end of the first six months, the weight of the stomach has doubled.

(2) By the end of the first year, it has tripled.

(3) By the end of the second year, it has increased about fivefold.

(*d*) Capacity (anatomic). (See Scammon, pp. 408–410.)

(1) The anatomic capacity of the stomach of the full term newborn baby is between 30 and 35 c. c.; at the end of one month it is about 100 c. c.

(2) During the next eight months, the stomach increases about 30 per cent per month.

(3) In the second year, the capacity is about 500 c. c.; in the third year, about 550 c. c.; in the fourth year, about 600 c. c.

(4) In the later part of childhood, the average capacity is between 750 and 950 c. c.

(5) The adult capacity is between 1,200 and 1,600 c. c.

A. Internal organs—Continued.

3. Intestines.
   - (*a*) In the infant, the intestines are longer in proportion to the length of the body than in the adult (six to eight times the length of the body in the infant; five times the length of the body in the adult).
   - (*b*) The muscles of the intestines in infancy are poorly developed; the elastic tissue, small in amount.
   - (*c*) The sigmoid flexure is especially long (nearly one-half the length of the large intestine), tortuous and mobile (constipation is, therefore, common in infancy).

4. Liver.
   - (*a*) The liver in the infant is relatively larger than in the adult (one-eighteenth of the body weight in the newborn infant; one-thirty-fifth in the adult).

5. Kidneys.
   - (*a*) In the infant, they are relatively larger than those of the adult and are situated lower down.
   - (*b*) In the newborn child, the two kidneys are nearly equal in volume.
   - (*c*) During the first year the left kidney begins to increase in volume, is placed higher than the right, and does not sink to adult level until about the seventh or eighth year.

6. Adrenals.
   - (*a*) Size of each at birth is no less than one-third that of the kidney.
   - (*b*) In the adult they are only one-fortieth the weight of the kidney.

7. Thymus.
   - (*a*) The weight of the thymus is greatest at birth.
   - (*b*) It gradually diminishes in size, but presumably preserves some activity until the period of puberty.
   - (*c*) From then on it undergoes gradual atrophy.

8. Testis and ovary.
   - (*a*) The testis increases to sixty times its absolute weight and to three times its relative weight.

A. Internal organs—Continued.
8. Testis and ovary—Continued.
(*b*) The ovary is relatively slightly smaller in the adult than in the infant.

B. Skeleton.
1. The infant has numerically more bones than the adult, owing to many unfused parts in its skeleton.
2. The total relative weight remains about the same (16 per cent).
3. The composition is markedly different.
(*a*) Less ash and more water are in the child's bones. (This explains why the bones of the child are very flexible, while those of the adult are brittle.)
(*b*) Minerals (calcium especially) are a most essential part of the food requirement during childhood to supply the bones with proper materials. Where minerals are inadequate, serious nutritive disorders occur.
4. The proportions and shapes of various parts of the skeleton differ greatly in childhood.
(*a*) Head.
(1) Cranium of the infant is large; face, small; sinuses, not developed; and jawbone comparatively rudimentary in infant.
(2) Anterior fontanelle is usually closed at 1½ years of age, failure to close by the end of the second year being abnormal.
(3) The circumference of the head is about 14 inches at birth; 17 inches at 6 months; 18 inches at 1 year; 19 inches at 2 years; 20.5 inches at 5 years; 21 at 10 years; 21.8 at 15 years. (See Holt and Howland, 1916, p. 20.)
(*b*) Spine.
(1) At birth the spine is broader and shorter than in adult life.
(2) It is more nearly straight than in the adult. Curves increase with growth.

B. Skeleton—Continued.

4. The proportions and shapes, etc.—Continued.

(*c*) Thorax.

(1) The thorax of the infant is funnel-shaped; the ribs are almost horizontal.

(2) The circumference of the chest at birth is about 13.5 inches; at 1 year, 18 inches; at 2 years, 19 inches; at 5 years, 21.5; at 10 years, 25.8; at 15 years, 30. (See Holt and Howland, 1916, p. 20.)

(*d*) Collar bone.

(1) The collar bone is short at first, forming narrow shoulders.

(*e*) Arm bones.

(1) The arm bones of the infant are only relatively slightly shorter than those of the adult. They soon reach the same proportion to the body length as in the adult.

(*f*) The pelvis of the child is much smaller relatively than that of the adult.

(*g*) The legs of the infant are three-eighths of the total length; of the adult, four-eighths.

(*h*) Feet.

(1) The soles of the infant's feet are directed toward each other, which is a survival of the fetal position.

(2) The plantar arch is at first not well developed.

(3) The heel bone (os calcis) of the infant is small. It develops later and projects backward, apparently as a result of pulling of the strong calf muscles.

C. Muscles.

1. An infant's muscles form 23 per cent of its body weight; those of an adult, 43 per cent of the body weight.

2. An infant can hold up its head at 3 to 4 months of age; can sit up at about 7 or 8 months; can stand at 11 or 12 months; and can walk at 14 or 15 months of age. (See Holt, 1919, p. 25.) (See Section IV, Outline 1, Topic I.)

C. Muscles—Continued.

3. The muscles should be firm, not flabby. (Freedom for healthy exercise of the growing muscles must be afforded without overtaxing.)

D. Brain.

1. The brain of the infant is relatively three or four times larger than that of the adult.
2. Nearly the full weight is attained at 7 years. The cortical cells are apparently formed early in life; probably during the first three years of childhood. (See Donaldson, p. 148.) The later growth is largely due to the development of cell attachments; intercellular tissues, and the ingrowth of axons into the cortex and their myelinization.

VII. STAGES IN THE DEVELOPMENT OF THE CHILD.

A. Prenatal period. (See Section I, Outline 2, Topic 1.)

1. Fertilization of human ovum.
   - (*a*) Ovum, or female cell, is $\frac{1}{125}$ inch in diameter; spermatozoon, or male cell, is much smaller.
   - (*b*) Chromosomes of the male cell (spermatozoon) fuse with those of the female cell (ovum).
   - (*c*) Sex is determined at fertilization, though not shown in external form until the end of the third month.
2. Segmentation of the human ovum.
   - (*a*) The new cell divides and multiplies.
   - (*b*) The cohering mass thus formed reaches the uterus, where it becomes imbedded.
     - (1) The outer covering becomes the protecting membranes (chorion and ammion) and the nourishing placenta, to which the embryo is attached by the umbilical cord.
     - (2) The inner portions form the embryo. This attains semblance of human form by the sixth week, and from that time on is called the fetus.
3. Growth of the fetus.
   - (*a*) Growth proceeds very gradually at first.
   - (*b*) Ninety per cent of the weight is attained in the last half of pregnancy.

A. Prenatal period—Continued.
3. Growth of the fetus—Continued.
(*c*) At this time, in addition to increase in length, there is gradual deposition of fat under the skin, which is important after birth in preventing the escape of heat from the child's body.

B. Birth (parturition) and the first days of life.
1. Birth. (See Section I, Outline 2, Topic I, G.)
(*a*) Fetus reaches full development about 280 days from beginning of last menstruation. (See Section I, Outline 3, Topic II.)
(*b*) Size of newborn child.
(1) Head and thorax. (See Topic VI, B, 4.)
(2) Average weight, 7½ pounds. (Because of the mechanical strain due to the passage of the fetus through the birth canal it is advantageous that the child should weigh under 8 pounds.) (For diet during pregnancy see Section I, Outline 3, Topic IV, B.)
(3) Average length, 19½ inches. Variations in weight are more frequent than variations in length.
(*c*) Breathing.
(1) The lungs must expand at birth or the persistence of the fetal condition of collapsed lung, or atelectasis, will occur to a greater or less extent.
(2) The respiration rate at birth is 30 to 40 per minute; it is irregular under 3 years.
(*d*) Circulation.
(1) The circulation through the arteries which connect the placenta and the fetus ceases with the expansion of the lungs and the establishment of the pulmonary circulation, and blood currents take a permanent course.
(2) Pulse rate is about 120 per minute at birth; the ratio of the pulse rate to the respiration rate is 3 to 1.
(*e*) Sensory development is little understood. (See Section IV, Outline I, Topic II, A.)

B. Birth (parturition) and the first days of life—Continued.

2. First days of life.

(*a*) Adjustment is made to ingestion, digestion, and elimination of food.

(1) Kidneys should function during the first few hours and frequently thereafter. (If reddish precipitate is present, the infant needs more water.)

(2) Bowels pass meconium, dark brownish-green in color and semisolid, for the first two or three days. By the fourth or fifth day normal yellow stools are passed. (If they continue brown, it is usually because of insufficient food.)

(3) The initial loss in weight usually stops by the third day. The loss is larger actually and proportionately in heavier infants. The loss should be regained by the tenth day.

(*b*) At least 20 hours of sleep are required.

(*c*) The first acts are mainly reflex, such as sucking, swallowing, and aimless waving of the arms and legs.

(*d*) An infant has great strength in its arms. The entire body weight can be maintained by the arms. (See Section IV, Outline I, Topic I.)

(*e*) At first an infant can perceive light, but can not focus an image. Hearing is well developed, but is dependent on the clearing of the Eustachian tube of fluid. (See Section IV, Outline 2, Topic II.)

C. The first five years.

The period is marked by tremendous physical as well as mental growth. (See Section IV, Outlines 1 and 2.)

One of the most important factors influencing growth is nutrition. The transition from the milk diet of infancy to one containing a variety of foods must be intelligently met. The diet should be well balanced and should contain an abundance of growth-producing foods. (See Section II, Outline 5, Topic II.)

Growth is generally retarded by disease of any serious nature. The so-called "children's diseases" and the large number of physical defects which occur during these early years are largely preventable. (See Section III, Outline 3, Topic I.)

1. Growth in weight.

(*a*) During the first six months—averages at least 4 ounces a week, usually more.

C. The first five years—Continued.

1. Growth in weight—Continued.

(*b*) During the second six months—averages slightly less than 4 ounces a week.

(*c*) During the entire first year—averages 12 pounds or more.

(*d*) During the second year—averages ½ pound a month; total during year, 5 to 6 pounds.

(*e*) During the next three years—averages 5 pounds a year (boys' weight slightly heavier than girls').

2. Growth in height.

(*a*) During first year—9 inches.

(*b*) During the next three or four years—average, nearly 3 inches a year.

(*c*) At beginning of the fifth year—birth length is doubled.

3. Dentition. (See Section III, Outline 2, Topic III.)

(*a*) Usual order of appearance of the milk teeth.

(1) At 6 to 9 months—2 lower central incisors.

(2) At 8 to 12 months—4 upper incisors.

(3) At 12 to 15 months—2 lateral lower incisors; 4 anterior molars.

(4) At 18 to 24 months—4 canines (so-called stomach or eye teeth).

(5) At 24 to 30 months—4 back molars.

(*b*) By end of second year—usually 16 teeth. Twenty teeth, or the entire first set, should be cut by 2½ years.

4. Muscular development and control is most marked. (There is special need for wholesome outdoor play.) (See Section IV, Outline 3, Topic I.)

D. From the fifth to the twelfth year.

The body has, by this period, acquired a certain stability of growth. Plenty of exercise and wholesome food and health habits are essential. (See Section II, Outline 6.) No physical strain should be permitted.

1. Growth in weight.

(*a*) Up to 10 years, the annual gain in weight is about 5 pounds, the same for both sexes.

(*b*) During the eleventh year, girls usually gain more rapidly than boys, and surpass them in weight.

2. Growth in height.

(*a*) The annual increase in height is about 2 inches from 5 to 12 years of age, and the same for

D. From the fifth to the twelfth year—Continued.
2. Growth in height—Continued.
both sexes. (See Holt and Howland, 1919, p. 20.)

E. From the twelfth to seventeenth years. (See Section IV, Outline 5; Section II, Outline 7, Topic I.)

This second period of extremely rapid growth begins a little earlier in girls than in boys. Girls from 12 to 14 years of age are apt to be somewhat heavier than boys of the same age.

1. Growth in weight.
   (*a*) In girls between 11 and 14 years of age, and in boys between 13 and 16 years of age, the annual increase in weight is doubled over the usual gains since infancy.
   (*b*) Girls gain about 10 pounds and boys about 12 pounds annually during puberty. (See Holt and Howland, 1919, p. 20.)
2. Growth of body parts.
   (*a*) Legs become elongated.
   (*b*) Chest broadens.
   (*c*) Pelvis enlarges and broadens.
   (*d*) Muscles enlarge.
   (*e*) Lung capacity increases.
3. Sexual maturity.

Puberty corresponds to the second growth period (see Topic IV, B) and shows great variation as to age. Some children are immature at 17 years, while others are mature at 12 years. Matured children of any age are stronger and more robust than those of the same age who are immature. (For this reason all social and educational work should take into consideration the physiologic age of the child.)

   (*a*) Physical changes.
      (1) In boys.
         (*a*) Change of voice.
         (*b*) Appearance of beard and pubic and axillary hair.
         (*c*) Development of testis.
      (2) In girls.
         (*a*) Development of breasts.
         (*b*) Appearance of pubic and axillary hair.
         (*c*) Menstruation.
   (*b*) Mental changes. (See Section IV, Outline 5, Topic II.)

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OUTLINE 2. FOOD REQUIREMENTS IN INFANCY.

Next in importance to the insuring for every child the benefit of breast feeding during the early months of life is the determining of what food should be used when, for any reason, breast feeding has to be discontinued or supplemented. The intelligent solution of this problem depends on an understanding of the peculiarities of the infant's digestion and growth needs, and on the means of producing and supplying clean cow's milk for infant use. A detailed study of the purpose, use, and special value in infancy of each of the essential constituents of food is necessary to avoid making mistakes in feeding the infant and young child.

I. STRUCTURAL PECULIARITIES OF THE DIGESTIVE TRACT IN INFANCY COMPARED WITH THAT IN ADULT LIFE.

A. Mouth.
   1. Teeth, none at first; of no importance during the first year.

B. Stomach. (See Section II, Outline 1, Topic VI, A, 2.)
   1. Position more vertical.
   2. Shape more tubelike.
   3. Relative size and capacity smaller.
      (*a*) Capacity of living stomach (physiologic capacity) is the amount an infant can take at a nursing. It must be distinguished from postmortem (anatomic) capacity which is much smaller. The usual measurements given are for anatomic capacity.
      (*b*) Gastric capacity is dependent on—
         (1) The chronological age of the individual.
         (2) Previous feeding history.
         (3) Degree of physical development.
         (4) Individual physical constitution. (See Scammon, p. 406.)
      (*c*) The average meal from birth to 1 year varies in amount from 1 to 10 ounces. (See Section II, Outline 4, Topic V.)
   4. Relatively fewer gland cells.
   5. Weak muscular development of the cardiac orifices. (This explains the frequency of vomiting in early infancy.)

C. Intestines. (See Section II, Outline 1, Topic VI, A, 3.)
   1. Relatively less development of muscular and connective tissue layers. (This explains the frequency of overdistension, constipation, gas, and colic.)
   2. Relatively greater length of intestines, especially the sigmoid flexure.

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II. FUNCTIONAL PECULIARITIES OF THE DIGESTIVE TRACT IN INFANCY.

The alimentary system is in a "formative stage" during infancy. (This is one explanation of the frequency of gastrointestinal disorders during the early years of life.)

A. Mouth.

1. Salivary secretion.
   - (*a*) Present at birth, and contains ptyalin (salivary diastase).
   - (*b*) Quantity and starch-splitting property increases rapidly after three to four months.

B. Stomach.

1. Motility.
   - (*a*) Peristalsis is less in infancy than in adult life.
   - (*b*) Variations in motility have been explained as not necessarily due to the composition of the food, but to different effects on peristalsis of variations in amounts, either within or above the gastric capacity.
   - (*c*) Digestion is aided by the motility of the stomach. (The churning movements tend to break up the casein curds.)

2. Secretions.
   - (*a*) All the factors which take part in the adult digestion are present in the infant, but in a weaker form.
   - (*b*) Gastric juice is stimulated by:
     - (1) Act of sucking.
     - (2) Presence of food in the stomach.
     - (3) Large quantities of water.
   - (*c*) Amount of secretion is influenced by:
     - (1) Composition of the milk. (High fat percentage tends to decrease the total amount.)
     - (2) Amount of food.

B. Stomach—Continued.

2. Secretions—Continued.

(*c*) Amount of secretion is influenced by—Contd.

(3) Dilution of the food. (Extreme dilution reduces the amount secreted.)

(4) Length of the interval between feedings.

3. Digestion.

(*a*) The rôle of the stomach in digestion is more important in the adult than in the infant.

(*b*) As in the adult, the function of the stomach in infancy is to act as a reservoir and to assist intestinal digestion by gradually passing on to the duodenum the food elements so changed as to facilitate their complete digestion.

(*c*) A considerable amount of food passes into the intestines without undergoing gastric digestion.

(1) In the nursing infant food begins to leave the stomach almost at once, and within five minutes a very considerable proportion of the meal has left the stomach. At the end of half an hour the greater part of the food taken has reached the intestines.

(2) In infants taking cow's milk the food stays longer in the stomach, but usually after a few minutes food begins to appear in the intestines. (See Holt and Howland, p. 316.)

(*d*) On the average the stomach is emptied—

(1) In about two hours in infants fed woman's milk.

(2) Only after three hours in infants fed cow's milk. (The time of emptying varies inversely with the amount of food taken and the amount of fat in the food.)

4. Absorption.

(*a*) Little absorption takes place from the stomach.

B. Stomach—Continued.
4. Absorption—Continued.
(*b*) A certain proportion of sugar and peptones is absorbed.
(*c*) Practically no water, fat, or salts are absorbed.

C. Intestines.
1. Secretions.
(*a*) Pancreatic ferments, bile, and intestinal secretions are present in the newborn infant.
2. Digestion.
(*a*) Less is known about intestinal digestion than stomach digestion in infancy.
(*b*) Relatively greater length of intestine in the infant than in adult promotes slow and thorough digestion.
3. Absorption.
(*a*) Absorption from the small intestine is very rapid; absorption from the large intestine, except for water, is quite imperfect.
(*b*) Protein is absorbed in the form of peptids and aminoacids.
(*c*) Fat is absorbed in the form of fatty acids and soaps, but in their passage through the walls of the intestine the fatty acids are converted into neutral fats.
(*d*) Carbohydrates are absorbed as glucose (dextrose). Practically all the carbohydrates of the food are absorbed.
(*e*) Absorption varies with the kind of milk taken.
(1) A healthy infant, fed woman's milk, absorbs about 90 to 98 per cent of the ingested fat, from 85 to 95 per cent of the protein, and about 80 to 85 per cent of the salts.
(2) A healthy infant, fed cow's milk, absorbs about 85 to 90 per cent of the ingested fat, about 90 to 95 per cent of the protein, and about 60 per cent of the salts. (See Holt and Howland, p. 320.)

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III. INFLUENCES OF GROWTH ON FOOD REQUIREMENTS IN INFANCY.

A. Peculiarities of the period.

1. Relative to its body weight an infant consumes about twice as much food (in terms of energy) as the adult. The rapidity of growth in infancy increases the importance of adequate feeding and undisturbed digestion. (See Section II, Outline 1, Topics III and IV.)
2. Healthy infants show a wide tolerance for food. They often bear unusual proportions or excessive amounts of one or more of the essential food constituents, and may even thrive temporarily on a diet far from what is best.
3. In early infancy, all food must be liquid.

B. Use of food in the body. (See Talbot.)

1. Approximately 90 per cent of the food taken by an infant is available for use in the body; the balance is lost in the excretions.
2. For convenience the nutritive value of food is usually expressed in terms of its fuel value and is measured in calories. The large calorie, or the amount of heat required to raise 1 kilogram of water 1° C. (1 pound of water 4° F.), is the standard measurement of heat energy. The minerals of the food do not serve as fuel, and so are not measured in this unit. The energy quotient is a term sometimes used for the number of calories given per pound of body weight. The available calories of the food are used in infancy to supply energy for—
   (*a*) Maintenance.
      (1) This is usually called basal metabolism, which is the minimum metabolism necessary to maintain life, with the patient at complete muscular repose, as in sleep, preferably without any food in the stomach. (Infants and young children can not be studied without food.)

B. Use of food in the body. (See Talbot.)—Continued.

(*a*) Maintenance—Continued.

(2) The food intake must first supply the energy needed for maintenance. If there are too few calories for the total body needs, growth is first affected, then muscular activity curtailed, and, finally, the body fat is consumed to supply food.

(3) The total number of calories used for maintenance increases steadily in normal children from birth to puberty. For the normal infant, not the newborn, this averages between 50 and 65 per kilogram of body weight, irrespective of age. (The metabolism of the newborn infant is considerably lower.) (See Murlin.)

(4) To obtain the total metabolism before the age of 6 months, the basal metabolism must be a little more than doubled; after 6 months of age, doubling the basal metabolism more than gives the total number of calories necessary for a child to grow. (This difference is explained because the growth factor is greater during the first year of life than it is during later childhood.)

(5) The basal metabolism of boys and girls shows no difference up to about 1 year of age, or about 10 kilograms (22 pounds) of weight, after which there is a sex differentiation.

(6) Normal infants with less weight than the average usually have a slightly lower basal metabolism.

(7) Infants with greater weight than normal tend to have a higher basal metabolism.

(*b*) Muscular activity.

(1) Muscular activity has been proved to increase metabolism greatly.

(2) In normal children the total number of calories used in muscular activity varies greatly.

B. Use of food in the body. (See Talbot.)—Continued.

(*b*) Muscular activity—Continued.

(3) In a normal infant, the average increase in metabolism due to muscular exercise over the basal metabolism is estimated as 25 per cent.

(4) A quiet infant uses fewer calories for muscular work than an active or a crying infant. The newborn and the overfat infant will gain on a lower food intake than an infant that is using its muscles.

(5) The breast-fed infant is generally considered to require fewer calories for normal growth than the artificially fed infant. (This may be because less energy is required to make the food available for the body, or because, on the whole, the breast-fed baby is quieter and sleeps more.)

(6) Excessive muscular activity from any cause may use up the calories necessary for growth and even make inroads on the body fat. (A child may "run the flesh off his bones.")

(7) The effect of too few food calories in restricting muscular activity is demonstrated in the quietness of underfed babies. (An underfed child soon tires at play.)

(*c*) Growth. (See Section II, Outline 1, Topic IV.)

(1) The food used for growth includes the constituents from which new tissue is formed (proteins, minerals, vitamines, and water), and the constituents (fat, carbohydrates) which form the body fat, which to a great extent accounts for increase in weight.

(2) Since the greatest rate of growth is during the first year of life, relatively more food must be available for growth during this period than at any other time.

(3) The rate of growth must depend on the number of available calories in the

B. Use of food in the body. (See Talbot.)—Continued.

(*c*) Growth—Continued.

food. The available calories must first supply the energy needed for maintenance. If there are too few calories for the total body needs, muscular activity and growth are curtailed. (The starved child is undersized and listless.)

(4) Diminished amount of food, excessive muscular exercise, or excessive loss through the stools may affect the calories available for growth.

(5) The effect of digestive disorders or disease in infancy or childhood is to stop the normal gain in weight, then to cause loss of weight, and finally to arrest further development, if the available calories are only enough to cover the basal metabolism plus the expenditure for muscular activity and loss in stools. (It should be remembered that fever increases the basal metabolism at the same time that the appetite and ability to take the usual food are affected.)

(6) It has been estimated that 36 per cent of the food intake is used for growth at 3 months, 26 per cent at 6 months, and 21 per cent at 9 months.

C. Basis for calculation of food requirement.

The food requirement of the body depends on the amount of active protoplasmic tissue present and the amount of radiation from the surface. Since no exact means of estimating tissue activity are available, the calculations of the food requirements are based on—

1. Surface area. (Formulas have been worked out by which surface area of any infant can be calculated, but these are too complicated for ordinary use.)
2. Body weight. (This is the method usually used.)

(*a*) Average daily amount of milk taken by the normal breast-fed infant is the best guide to the amount of food required in reference to body weight.

C. Basis for calculation of food requirement—Continued.

2. Body weight—Continued.

(1) At the end of 1 month, 500 calories of milk, or about 59 calories per pound of body weight.

(2) At the end of 6 months, 785 calories of milk, or about 50 calories per pound of body weight.

(3) At the end of 9 months, 880 calories of milk, or about 47 calories per pound of body weight. (See Talbot, pp. 232–233.)

(*b*) For artificial feeding, the usually accepted requirement is 100 calories per kilogram (2.2 pounds), or 45 calories per pound of body weight for each 24 hours from the end of the second week to the ninth month.

(1) During the first two weeks the caloric requirement is considerably less than 45 calories per pound, averaging only about 30 calories.

(2) After the eighth month the requirement falls to about 40 calories per pound. (See Carter, Howe and Mason, p. 276.)

(*c*) A very fat infant may gain and do well on less than 100 calories per kilogram, while a very thin and atrophic infant may require between 130 and 200 calories per kilogram of body weight to enable it to gain in weight. (The greatest skill is required to feed successfully a markedly underweight or sick infant. If possible such infants should be under the care of a pediatrist.)

(*d*) The tendency in the past has been rather to underestimate than to overestimate the nutritive needs of infants and young children.

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IV. ESSENTIAL FOOD CONSTITUENTS IN INFANCY.

(See Section II, Outline 5, Topic II; Outline 6, Topic II.)

A. Protein.

The infant requires protein for the formation of new tissue, as well as for the replacing of tissue waste. Protein is also used to a slight extent to furnish energy, and this may be of considerable value when for any reason low fat percentages are indicated in artificial feeding.

1. Nitrogen retention.

An infant shows an extraordinary tendency to retain nitrogen and other substances necessary for the formation of new tissue even under most adverse circumstances. In general, nitrogen retention is promoted by carbohydrates of the food, while fat exhibits little if any such property.

(*a*) Normally nitrogen retention is dependent on the amount of protein in the food and the amount of total ash retained. Nitrogen must be built into new tissue if it is to be retained in the body, and for this process salts are necessary. If the salts are not available, the nitrogen is excreted (for every gram of nitrogen about 1.7 grams of ash are retained). (See Howland.)

(*b*) The younger the infant, the greater is the retention and utilization of nitrogen per pound of body weight. Growth is more rapid in young than in older babies, and more nitrogen is thus used in building new body tissue.

(*c*) A well baby retains more nitrogen than a sick baby of the same age. In disturbances of digestion, especially when caused by fat, the loss of nitrogen in the stools is considerable, and even more is lost in the urine. Loss of body nitrogen and a negative nitrogen balance may result.

2. Protein requirement.

(*a*) The protein of milk is the most available form of protein and is easily digested by infants.

A. Protein—Continued.

2. Protein requirement—Continued.

(*b*) In general, animal protein is considered more valuable than vegetable protein, because it is more easily digested and absorbed and has been found more efficient in supporting the growth of young animals.

(*c*) Vegetable protein may be used for part of the protein requirement, but can not permanently replace animal protein in the food during infancy and childhood.

(*d*) Since the younger the infant, the more rapid is its growth, the protein requirement is greatest during the early months of life (often 50 per cent of the protein intake is retained for growth). (See Howland, p. 397.)

(*e*) The average protein need of an infant is estimated to be at least 0.7 gram per pound of body weight. (Many babies require probably as much as 0.9 gram per pound of body weight, and can often take much more than this with advantage.) (See Morse and Talbot, p. 201.)

(*f*) Less than 1 ounce of whole cow's milk per pound of body weight covers this protein need, but more is generally used in artificial feeding. (One ounce of cow's milk, which averages about 3.5 per cent protein, contains 9.9 grams of protein.)

(*g*) If there is enough protein to cover tissue waste an insufficiency may maintain life, but the baby can not thrive; if there is an actual deficiency of protein, the child will die of malnutrition, even if all the other food constituents are properly proportioned and the total caloric value of the food is high.

(*h*) The protein requirement throughout childhood must obviously be far greater than after growth is achieved. (For young children it is more than twice as much per unit of weight as for adults.) (See Sherman, p. 231.)

3. Protein in woman's milk and cow's milk.

(*a*) In woman's milk from 8 to 9 per cent of the calories are in the form of protein; in cow's milk about 19 per cent. (See Sherman, pp. 229–231.)

A. Protein—Continued.

3. Protein in woman's milk and cow's milk—Continued.

(*b*) The amount of protein in woman's milk may be taken to represent a sufficient amount of protein, but not much in excess of the needs of the infant. (This would hold exactly, if all proteins were equivalent to lactalbumin in power of supporting growth, due to the abundance of certain essential amino acids, especially lysin.) (See Sherman, p. 56.)

(*c*) The amount of protein required by the infant fed on cow's milk is greater than that required by the infant fed on woman's milk. The explanation for this is suggested in the possible deficiency of casein, the chief protein of cow's milk, in certain amino acids, which are furnished abundantly by lactalbumin, the chief protein of woman's milk. (See Holt, p. 183.)

(*d*) A larger amount of protein is apparently necessary if milk is boiled. (See Daniels, Stuessy, and Frances, p. 54.)

4. Status of protein in infant feeding.

(*a*) In whole milk modifications, which are now generally used in artificial feeding, the protein is usually higher than in woman's milk, for cow's milk contains between two and three times as much protein as woman's milk. (In certain nutritive disorders excessive amounts of protein are often given for considerable periods as a therapeutic measure.)

(*b*) The casein of cow's milk is apparently well digested and readily absorbed by the average well infant. Some infants, especially in the early months of life, have difficulty in its digestion, due to the formation of large solid curds in the stomach, which have to be digested by being slowly worn away. (Boiling or heating the milk is one method of preventing this large coagulation.) (See Section II, Outline 4, Topic III, C, 4.)

(*c*) The present tendency to feed high percentage of protein and to minimize the possibility of digestive disturbance of protein origin is the re-

A. Protein—Continued.

4. Status of protein in infant feeding—Continued.

verse of what was held ten years ago. The excess of casein in cow's milk was then believed to cause most of the trouble in infant feeding.

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B. Fat.

The chief use of fat in the food is to function as fuel, to be burned up to furnish energy for heat and muscular work. Fat is stored and furnishes part of the body fat, which is a fuel reserve. Body fat acts as a conservator of body heat through its low conductivity. There is also an intimate relation between fat and its use in the body and resistance to infection.

1. Fat calories.

(*a*) The amount of fat either in woman's milk or in cow's milk varies usually between 3 and 4 per cent.

(*b*) The high fat content of woman's milk is an indication of the importance of fat in the nutrition of the infant. The fat content of the body of the new born is higher than that of the adult. (See Section II, Outline 1, Topic III, A, 2.)

(*c*) About 47 per cent of the calories of woman's milk is in the form of fat. (A breast-fed infant at 1 month takes approximately 235 calories of fat daily; at 6 months, 369 calories; and at 9 months, 413 calories daily.) (See Topic III, 3.)

(*d*) An adult on an average diet including 900 calories of fat takes about one-third of his daily food calories in the form of fat.

B. Fat—Continued.

1. Fat calories—Continued.

(*e*) The higher caloric value of fat than of the other food constituents makes the capacity to absorb fats of the highest value in infancy when it is necessary to have food of small but high caloric value. (The ability to digest fats is an index not only of an infant's digestive capacity but of its well-being.

(*f*) Though fat is largely replaceable by protein and carbohydrates, in cases where low fat percentages have to be given, it is frequently most difficult to maintain the desirable number of total calories, without unduly increasing the bulk of the food.

2. The digestion of fat.

(*a*) A healthy infant absorbs about the same percentage of the fat of cow's milk as of mother's milk.

(*b*) There is, however, a marked difference in digestibility of the two fats. (Most infants of the same age can not take as much of the fat of cow's milk as of woman's milk without disturbance.)

(*c*) This difference between the fats of the two milks may possibly be due to the much greater proportion of volatile acids in cow's milk, or to its lack of freshness.

(*d*) Tolerance to the fat of cow's milk varies greatly and intolerance to fat once established is more persistent than to any other ingredient of the food.

(*e*) For these reasons, in artificial feeding with cow's milk, low fat percentages should be used in the first weeks of life, at the beginning of weaning at any period, for infants suffering from digestive or nutritional disorders, during all disturbances accompanied by fever, and in periods of very hot weather.

(*f*) The amount of fat given during infancy needs to be most carefully watched, as digestive disturbance is more often due to fat than to any other food constituent.

(*g*) The percentage of fat that can safely be allowed a healthy infant varies from 1 to 4 per cent.

B. Fat—Continued.

3. Disturbances attributed to fat.

(*a*) Ordinarily, an excessive amount of fat in the food is constipating and does not have a laxative action, as is generally thought.

(*b*) Because of the frequent indigestibility of the fat of cow's milk, the substitution of other fats, such as olive oil, coconut or almond oil, beef or tallow oil has been advocated for the artificial feeding of infants and is used in different synthetic milk preparations.

(*c*) In abnormal conditions of the digestive tract, the amount of fat absorbed varies greatly. As the water in the stools increases, the per cent retained decreases. In severe diarrhea, the retention of fat may be little more than half the normal retention. The soap fats form the preponderating part of the total fat in normal or constipated stools; in diarrhea, neutral fats increase as the soap fats decrease and make up the major part of the total fat of the stool. (See Holt, Courtney, and Fales, pp. 438–439.)

(*d*) In chronic malnutrition, increasing the fat in the diet considerably raises the output of salts in the stools.

(*e*) The body fat is largely formed from the fat of the food. In atrophic conditions, where infants can not tolerate fat or sugar, the body fat is greatly reduced.

(*f*) The emptying of the stomach is delayed by large amounts of fat in the food. "The higher the proportion of fat in the meal, the longer the food is retained in the stomach, and also the smaller the amount of gastric juice secreted." (See Holt and Howland, p. 318.)

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C. Carbohydrates.

Carbohydrates furnish a valuable source of body fuel, indeed the main source of energy for muscular work. The ease with which sugar is oxidized in the body makes it especially available as a source of body heat. Besides their fuel value, carbohydrates can be synthesized into fat, and within limits they increase the retention of nitrogen.

1. Carbohydrates can be substituted to a large extent for the fat in the food of a healthy child.
2. If carbohydrates are included in the diet, less protein is needed, since the oxidation of sugar protects the protein of the body.
3. Carbohydrates have no effect on the retention of minerals, or the absorption of fat, if not given in excessive amount.
4. The infant's food contains less carbohydrate relative to its weight than that of the adult. About 44 per cent of the calories of woman's milk is furnished by the sugar, while about 60 per cent of the average adult diet is derived from carbohydrates.
5. Sugar.
   - (*a*) All carbohydrates of either woman's or cow's milk are in the soluble form of lactose or milk sugar.
   - (*b*) The proportion of sugar in woman's milk is over twice that in cow's milk and is greater than all its other solid constituents combined.
   - (*c*) The dilution of cow's milk in infant feeding further lowers its percentage of sugar.
   - (*d*) On woman's milk an infant receives slightly more calories in fat than in sugar, while on modified cow's milk usually more calories may be given safely in carbohydrates than in fat.
   - (*e*) The sugar percentage in modified milk for healthy infants should be about 6 per cent, never more than 7 per cent. If a higher percentage of carbohydrates is desired, it is safer to use starch for the extra amount. (See Section II, Outline 4, Topic III, C, 5, a.)
   - (*f*) Lactose, being the sugar present in woman's milk, has been generally held to be the most desirable form of sugar for artificial feeding.
   - (*g*) The three disaccharids, lactose, saccharose (cane sugar), and maltose are apparently equally well taken by a healthy infant, if given in proper amounts. An excess of any form of sugar frequently causes serious digestive disturbance.

C. Carbohydrates—Continued.

5. Sugar—Continued.

(*h*) Some infants, however, may not do well on any one of the sugars, in which case, a change is advisable. Many infants do better on mixed carbohydrates, or a starch and sugar combination.

(*i*) Lactose, which is split by the intestinal ferment lactase into the monosaccharids, dextrose (glucose) and galactose, is thought to differ from other sugars in the following points:

(1) It is less soluble than saccharose and hence less irritating to the stomach.

(2) The absorption is slow and entirely intestinal (it is, therefore, thought preferable in vomiting cases).

(3) It favors normal fermentation processes and thereby holds in check excessive putrefaction. (This is due to the longer stay in the intestinal canal.)

(4) The action is slightly laxative.

(5) An excess of lactose is distinctly irritating, causing an increase in peristalsis and diarrhea. (Lactose is badly born in all intestinal disturbances, when there is looseness of the bowels.)

(6) The assimilation limit (when absorption takes place more rapidly than digestion) is lower, but under normal conditions milk sugar is not found in feces or urine, unless more than 7 per cent lactose is given.

(j) Saccharose (sucrose) cane sugar, which is split into the monosaccharids, dextrose (glucose) and levulose (fructose), by the ferment invertase in the intestines, shows the following differences:

(1) The absorption is slower than maltose, but more rapid than lactose.

(2) The action is not laxative.

(3) As it is easily soluble, it is more likely to ferment in the stomach than lactose (it may cause or aggravate vomiting).

(4) The assimilation limits are supposed to be higher than for lactose and lower than for dextrin-maltose preparations.

(5) It is cheaper than lactose or maltose.

C. Carbohydrates—Continued.

5. Sugar—Continued.

(*k*) Maltose, or malt sugar, is used only in preparations containing large proportions of the polysaccharid dextrin. (For the percentage of maltose and dextrin in the more common preparations used, see Morse and Talbot, p. 207.)

(*l*) Dextrin-maltose.

(1) In the digestion of dextrin-maltose, the dextrin is changed into maltose, and the maltose broken into dextrose by the ferment maltase present in the stomach and intestines.

(2) The absorption is most rapid. As one molecule of maltose furnishes two molecules of dextrose, digestion with maltose preparations is more rapid and quicker absorption follows (maltose may possibly be absorbed as such).

(3) The larger the proportion of dextrin, the slower is the absorption and vice versa.

(4) The assimilation limit is higher than for lactose or saccharose.

(5) In most preparations, its action is laxative, due apparently to some substance other than maltose.

(6) Tolerance is more quickly gained for dextrin-maltose preparations after convalescence from intestinal disturbances due to sugar than for lactose.

(7) Dextrins are protective colloids and like starch tend to prevent the formation of large casein curds, and hence aid in the digestion of casein.

(8) Many infants will tolerate larger amounts of this than of the other sugars.

(*m*) Corn sirup (mixture of dextrin, dextrose, and a little maltose) and honey (mixture of levulose, dextrose, with a little dextrin, and saccharose) have been used successfully for the sugar addition needed in modifying cow's milk.

6. Starch.

This polysaccharid has also to be broken down into dextrose (glucose) before it is absorbed. The diastase of the

C. Carbohydrates—Continued.

6. Starch—Continued.

saliva begins this splitting, which is carried out to completion in the intestines. Starch is used for two purposes in infant feeding.

(*a*) To prevent the formation of large casein curds. For this purpose, only a small amount of starch is necessary (0.75 per cent of starch is as effective as larger amounts).

(*b*) To increase the strength of the food. (See Section II, Outline 4, Topic III, C, 5, b.)

(1) The infant is able to digest starch from birth on and this ability increases rapidly with age.

(2) By the third month, starch in the form of cereal water may be used to dilute cow's milk for infant feeding.

(3) In making 1 pint of cereal water for healthy infants, the following amounts of barley flour may be used:

(*a*) Three level teaspoonsful at 3 months of age.

(*b*) Six level teaspoonsful at 5 months of age.

(*c*) Nine level teaspoonsful at 7 months of age.

(*d*) Twelve level teaspoonsful at 9 months of age.

(*e*) Fifteen level teaspoonsful at 11 months of age.

(4) A mixture of starch and sugar is digested and absorbed by the average baby with less difficulty than an equivalent amount of sugar and higher percentages of carbohydrates can be used than when sugar is used alone. (The different rate of absorption may explain this.)

(5) Babies with an intolerance for sugar may take considerable starch without difficulty. This may be due to the relatively slow changes that occur in the splitting of starch.

C. Carbohydrates—Continued.

6. Starch—Continued.

(*b*) To increase the strength of the food—Continued.

(6) Babies with fat intolerance can often take a large amount of starch in addition to sugar, thus increasing the caloric value of their food.

(7) Starch in excessive amounts, especially where the food is deficient in protein and salts, may cause marked disturbances of digestion and nutrition. Impairment of nutrition and lowered resistance may follow. Diarrhea, caused by too much starch or sugar, is followed by loss of large amounts of fat, protein, and salts in the stools and may result in diminished absorption and retention of these food components.

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D. Inorganic salts.

Recent investigations show the important rôle that minerals play in producing growth and in regulating normal body functions on which health depends. The living tissues of the body can not be built or renewed without a definite supply of minerals as well as protein; the retention of nitrogen in the body is therefore dependent on salt metabolism. The salts are concerned also in the oxidation of food substances, the iron of the blood being of special importance. The water retention of the body and the composition of the body fluids are dependent on the salt content.

1. With the exception of iron, the body from the time of birth throughout life grows relatively richer in salts. (See Section II, Outline 1, Topic III, A 3.)
2. The salts present in cow's milk are about three and one-half times as abundant as in woman's milk.
3. The relative proportions of the various salts differ very little in the two milks. The greatest exception is in the case of phosphoric acid.

D. Inorganic salts—Continued.

4. The relative percentage of the different salts in the two milks are given in Table VII.

TABLE VII.—*Percentage of salts in cow's milk and in woman's milk.*[1]

Salts.	Cow's milk.	Woman's milk.
CaO	22.8	23.3
MgO	2.8	3.7
P_2O_5	27.4	16.6
K_2O	24.7	28.3
Na_2O	10.9	7.2
Cl	15.5	16.5

[1] From Holt and Howland, p. 150.

5. The amount of iron in milk is very small. It is usually estimated as about 0.00015 per cent in woman's milk, and only about one-third this amount in cow's milk. (See Holt and Howland, p. 151; some authorities give the iron content of cow's milk as high or higher than woman's milk.) (See Sherman, p. 305.)
6. An infant fed diluted cow's milk takes on the whole more inorganic salts than an infant fed woman's milk. There is in the former case, however, a deficiency in iron.
7. At birth the healthy infant has a store of iron in the body, chiefly in the liver, sufficient to supply the growth needs for this mineral for the first six months of life. (See Carter, Howe, and Mason, p. 96.) After this period, or if the infant is deprived of mother's milk earlier, the iron content of the food must be increased by the addition of substances rich in iron, such as vegetables, especially spinach, and egg yolk. (See Section II, Outline 5, Topic II, B, 4, a.) The use of beef juice as a source of iron in infancy should not be advocated. (See Section II, Outline 4, Topic VI, B, 5, a.)
8. The excess of salts an infant takes in cow's milk is not retained. It is estimated that an infant fed woman's milk absorbs about 80 to 85 per cent of the salts in the milk and retains from 40 to 50 per cent, while an infant fed cow's milk absorbs about 60 per cent of the total salts and retains only 15 per cent.
9. Therefore, before the end of the first year it is not necessary to add inorganic constituents (with the exception of iron) to the diet of an infant fed modified milk for the purpose of increasing the inorganic salts.
10. Alkaline substances, such as lime water, bicarbonate of soda, or citrate of soda, delay the coagulation of milk,

D. Inorganic salts—Continued.

and may be added if this is desirable, but are not needed ordinarily. It is possible that alkalization may be positively harmful from its effects on the vitamines of milk.

11. The normal healthy infant can thrive on the excess of salts and the abnormal proportions found in diluted cow's milk.
12. The digestive difficulties of certain infants are, however, undoubtedly attributable to these differences.
13. The importance of the different salts in normal digestion and metabolism, the symptoms of the disturbances they cause, and the amount of each mineral constituent which should normally be retained in infancy are far from being understood.
14. In general, a high protein proportion in the food favors a large retention of salts, if the intake of salts is also high. This may explain the favorable effects of protein milk in certain cases of diarrhea.
15. The influence on salt retention of a high carbohydrate proportion in the food is indirectly through its effect on water retention. Carbohydrates favor water retention, and an increase in water retention is accompanied by salt retention.
16. A diet, adequate in calories but deficient in salts, will be followed by a loss in weight, which is explained as due to a loss in water, and inadequate retention of protein.
17. In healthy infants, a high fat proportion in the food does not disturb, to any extent, the salt metabolism. If high fat feeding is persisted in until diarrhea is produced, the retention of salts is seriously affected and the result may be most disastrous.
18. Severe diarrhea from any cause, but especially from an excess of fat or sugar in the food, is followed by an excessive loss of all salts, especially potassium and sodium from the body. If the loss continues until the alkali reserve is exhausted, the infant's own tissues are broken down to furnish these substances. Excessive loss of nitrogen necessarily accompanies this dangerous condition of negative salt balance.
19. The relation of the metabolism of calcium to bone formation and the effect of the other essential food constituents on calcium metabolism is of the utmost significance in the understanding of rickets and other serious nutritive conditions.

D. Inorganic salts—Continued.

20. The calcium requirement varies with age and is relatively greater during the period of greatest growth.
21. The minimum normal absorption by infants taking a modification of cow's milk is assumed to be approximately 0.027 gram of calcium oxid per pound of body weight, which is the average absorption of a breast-fed infant. The absorption of children taking a mixed diet is less than that of infants on a milk diet or about 0.025 gram of calcium oxid per pound of body weight. An intake of at least 0.041 gram of calcium oxid per pound of body weight has been found necessary to insure a good absorption of calcium by children taking a mixed diet, which is a lower intake than that necessary for infants (0.06 to 0.09 gram). (See Section II, Outline 5, Topic II, B, 4, c.)
22. The absorption of calcium is dependent on the abundance of the fat as well as the calcium intake. The best absorption has been obtained in infants on a milk diet when the food contained from 0.045 to 0.060 gram of calcium for every gram of fat, and when at the same time not less than 1.8 grams of the fat per pound was taken; on a mixed diet, the best absorption was obtained experimentally when there was from 0.03 to 0.05 gram of calcium oxid for every gram of fat, and at the same time not less than 1.4 grams of fat was given per pound of body weight.
23. The calcium absorption by rachitic infants is much lower than by healthy infants. (See Holt, Courtney, and Fales.)

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E. Vitamines. (See Section II, Outline 4, Topic IX.)

The presence of certain accessory food substances in our natural foodstuffs and their importance in normal nutrition is a discovery

E. Vitamines—Continued.

of only the last decade. The chemical nature of these substances is not yet established, their number is still debatable, and their function little appreciated.

1. Three vitamines are now recognized:
   (*a*) Fat soluble "A."
   (*b*) Water soluble "B."
   (*c*) Water soluble "C."
2. All of these vitamines promote normal growth and development. Insufficiency of any one may impair nutrition and arrest growth.
3. The deficiency of any one causes a specific disease, which is cured only by adding to the food the vitamine which is lacking.
   (*a*) Xerophthalmia is caused by lack of vitamine "A."
   (*b*) Beriberi is caused by lack of vitamine "B."
   (*c*) Scurvy is caused by lack of vitamine "C."
4. The vitamines differ in their resistance to heat and various physical and chemical influences.
   (*a*) Water soluble "B" is fairly stable to heat in neutral or acid aqueous solutions, but it is quickly injured by alkalies.
   (*b*) Fat soluble "A" is less thermostable, but is not easily injured unless the heat applied is extremely high and of a long duration.
   (*c*) Water soluble "C" is the most unstable, thermolabile and easily injured by alkalization and desiccation. The length of time it is subjected to the injurious environment is more important than the intensity of the process.
5. There is a great difference in the amount of any one of these vitamines present in our natural foods.
   (*a*) The distribution of "A" is not widely spread in all foodstuffs, but is found abundantly in milk, especially in the fat, in egg yolk, in fish fat, especially cod liver oil, certain animal fats, especially the fat in glandular organs, such as the liver, and in green, leafy vegetables. It is not found in appreciable amounts in any plant oil.
   (*b*) The distribution of "B" is widespread in both the plant and animal world, especially in yeast, the germ of seeds, and in vegetables. Whole milk is comparatively low in this vitamine, and if milk is diluted, or top milk mixtures are used,

E. Vitamines—Continued.

5. There is a great difference in the amount of any one of these vitamines present in our natural foods—Continued.

an artificially fed infant may possibly receive too little of this material. Denatured foodstuffs, such as milled flour or polished rice, have lost this substance, and it is not present in pure starch, sugar, or fat.

(*c*) The distribution of "C" is less well known. It is found in certain fruits, especially lemons and oranges, in certain vegetables, especially raw cabbage, turnip, and potato, and in small amounts in meat and milk. It has not been found in yeast, fat, cereals, and pulses.

6. The vitamine content of different foods, specially the amount of vitamine "C" is of great importance in infant feeding, since scurvy is a relatively common disease in this country.

(*a*) Milk.

The vitamines in milk are obtained only by concentration from the food, as animals are apparently unable to construct them synthetically. It is possible, therefore, for any mammalian milk to be deficient or inadequate in regard to the vitamine content. (The significance of this in regard to certain diseases in infancy is just being appreciated.)

1. Cow's milk.

(*a*) It is never strongly antineuritic, or antiscorbutic.

(*b*) Stall-fed animals may produce milk deficient in vitamine "C," if they are not given enough fresh food such as roots.

(*c*) Milk loses its antiscorbutic quality if it is pasteurized, or stale, or heated for a second time, or alkalized, and particularly if more than one of these influences is operative.

(*d*) The antiscorbutic properties of dry milk depend on the quality and freshness of the milk

E. Vitamines—Continued.

6. The vitamine content of different foods, etc.—Continued.

1. Cow's milk—Continued.

at the time of drying, and on the degree of temperature and the period of heating used.

(*e*) An infant requires fully 1 pint of fresh raw milk daily, if it is taking no antiscorbutic in the shape of fruit or vegetable juice. More than this must be taken if the milk used is not fresh raw milk. (See Hess and Unger, "Scurvy VIII, Factors affecting the antiscorbutic value of foods," p. 239.)

2. Woman's milk.

(*a*) It seems probable that woman's milk rarely lacks vitamine "C." (The prevalence of potato in the dietary of the poor in this country may account for this.)

(*b*) Infants fed on mother's milk rarely show symptoms of scurvy. (This may be partly accounted for by the fact that the milk is taken directly from the breast and is absolutely fresh.)

(*c*) Woman's milk may, however, be deficient in vitamines. (Cases of scurvy as well as beriberi in infants taking mother's milk are reported.)

(*b*) Fruit and vegetable juices.

(1) Orange juice is a very potent antiscorbutic and the one most used in infant feeding. (See Hess and Unger, "Scurvy VIII. Factors affecting the antiscorbutic value of food," p. 229.)

(*a*) It is efficacious after boiling.

(*b*) It is efficacious after drying.

E. Vitamines—Continued.

6. The vitamine content of different foods, etc.—Continued.

(*b*) Fruit and vegetable juices—Continued.

(c) It may be neutralized and still be efficacious.

(*d*) It loses its efficacy by alkalization.

(*e*) Small quantities are efficacious. (10 c. c. will protect an infant.)

(*f*) It is not laxative, but increases the flow of urine.

(2) Tomato juice has been substituted recently in infant feeding for orange juice. (See Hess and Unger, "Scurvy VIII. Factors affecting the antiscorbutic value of food," pp. 237–238.)

(*a*) Canned tomato juice, which has been subjected to twofold heating in processing, is strongly antiscorbutic.

(*b*) It is tolerated as well as orange juice and has only about half its acidity.

(*c*) A teaspoonful may be given daily to an infant a few weeks old and an ounce to an infant a few months old. The daily amount may be increased to 4, 6, or 8 ounces if it is tolerated well.

(*d*) Tomato juice contains a considerable amount of water-soluble "B."

(*e*) Both tomato and orange juice contain appreciable amounts of iron. (See Section II, Outline 5, Topic II, B, 4, a.)

(*f*) It is most economical, as it may be kept for a number of days if on ice.

TABLE VIII.—*The relative value as antiscorbutic ascribed to various substances by the workers at the Lister Institute.*[1]

Orange juice (fresh)	1,000
Lemon juice (fresh)	1,000
Swede juice (fresh)	600
Turnip juice (fresh)	600
Lime juice (fresh)	150
Potato, boiled	75
Carrot juice (fresh)	75
Beet juice (fresh)	75
Grapes (fresh)	50
Raw milk	10
Dried milk	5
Lime juice (commercial preserved)	0

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F. Water.

The importance of water as an essential part of the diet usually receives little attention in the consideration of the food requirements. Water is a constituent of all protoplasm. The body secretions and the plasma of the blood are largely made up of water. As a solvent it assists in carrying food material to the body cells and in eliminating waste products. The osmotic equilibrium between the various organs and tissues of the body is dependent on their water content. The evaporation of water by means of the secretion of the sweat glands assists in maintaining a constant body temperature.

1. The food of all young mammals consists of from 80 to 90 per cent of water. The lack of water is more quickly felt than the lack of any of the other food constituents.
2. The water of the food performs the following function:
   (*a*) It dissolves the sugar, salts, and part of the protein.
   (*b*) It suspends the rest of the protein and the emulsified fat.
   (*c*) It promotes digestion. (The dilution of milk prevents large coagulation.)
   (*d*) It furthers rapid elimination.
3. The amount of fluid required by an infant, in proportion to its size and weight, is much greater than that required by the adult. An infant at 1 month requires about 2 ounces of water per pound of body weight, while an adult requires only about half an ounce. (The elimination of large quantities of urine in infancy is a normal attribute. As the infant takes relatively more food than an adult, the waste to be eliminated is also greater.)
4. The amount of fluid needed by an infant increases rapidly during the first three months, and more slowly after that.

F. Water—Continued.

5. The infant must receive daily about one-seventh of its body weight in fluid.
6. The young infant must take most of this fluid in its food, since any considerable amount of water alone is often refused. The volume of the food should be carefully regulated to meet the water requirement.
7. The older infant will take more water, and since fruit juice and soup should be included in the diet at this age, the fluid volume of its food need not be so great.
8. Too concentrated food in early infancy with a too low water intake may result in no gain in weight.
9. Of the water received it is estimated that—
   (*a*) Fifty-nine per cent is eliminated by the kidneys.
   (*b*) Thirty-three per cent is eliminated by the lungs.
   (*c*) Six per cent is eliminated by the intestines.
   (*d*) One to two per cent is retained.
10. Water retention is affected by the carbohydrates in the diet. The gain in weight often observed to follow the introduction of sugar or more sugar in the food is due to the lessened elimination of water, as a result of the presence in the organism of the products of the assimilation of the sugar absorbed. The gain in weight of babies receiving food with a high sugar content, such as condensed milk, may result in water-logging of the tissues and, if a digestive upset follows, an excessively rapid loss in weight will result.
11. If an adequate amount of water is taken, water retention may be increased by the addition of certain salts, such as sodium chloride. The potassium and calcium salts apparently have an opposite effect.
12. The greatest deposit of water is in the skin. In pathological conditions this may be increased and result in œdema.

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OUTLINE 3. SUBSTITUTES FOR MOTHER'S MILK.

The use of some form of mammalian milk for the nourishment of weaned infants is as old as legendary history. Wild animals were domesticated largely for their value as food, and the widespread use

of milk and milk products has advanced with civilization. As the length of the period of breast-feeding has become shortened, the importance of determining what to feed the infant after weaning has been increased. Since cow's milk is the best substitute for mother's milk at our disposal, the whole problem of the production of a clean, pure, adequate supply of milk is of the utmost importance.

I. A SUBSTITUTE FOR WOMAN'S MILK MUST CONTAIN THE ESSENTIAL FOOD ELEMENTS FOR GROWTH.

A. It must be properly proportioned for the body needs of the infant.
B. It must be adjusted to the infantile digestive powers.
C. It must be free from bacteria and other poisons.

II. THE PERCENTAGE COMPOSITION OF DIFFERENT MILKS.

TABLE IX. *Percentage composition of different milks.*

	Water.	Fat.	Sugar.	Protein.		Ash.
				Casein.	Albumin.	
Woman	[1] 88.20	[2] 3.50	[2] 7.50	[3] 0.43	[3] 0.72	[3] 0.20
Cow [1]	87.32	3.75	4.75	3.00	.40	.75
Goat [1]	86.04	4.63	4.22	3.49	.86	.76
Ewe [1]	79.46	8.63	4.28	5.23	1.45	.97
Mare [1]	89.80	1.17	6.89	1.84	1.84	.30
Ass [1]	90.12	1.26	6.50	1.32	.34	.46
Reindeer (sample 1) [4]	70.15	14.46	3.02	8.06	1.36	1.54
Reindeer (sample 2) [4]	64.25	19.73	2.61	8.69	1.66	1.43

[1] Richmond, Henry Droop: Dairy Chemistry, London, 1914, p. 392.
[2] Holt, L. Emmett, and Howland, John: Diseases of Infancy and Childhood, D. Appleton & Co., New York, 1919, pp. 182–183.
[3] Holt, L. Emmett, Courtney, Angela M., and Fales, Helen L.: "A chemical study of woman's milk, especially its inorganic constituents," in American Journal of Diseases of Children, vol. 10, October, 1915, p. 239.
[4] Werenskiold, F. H.: Tidsskr. norske Landbr. 2 (1895), pp. 372-375, abstracted in Experiment Station Record, U. S. Department of Agriculture, vol. 7, 1895-96, p. 713

III. DISCUSSION OF SIMILARITIES AND DIFFERENCES OF MAMMALIAN MILKS.

The milk of every animal is adapted to the size of the offspring, the rate of growth, and the length of the period before other food can be taken. The fact that the calf doubles its weight in 47 days and the infant in 180 days explains the chief differences between cow's milk and woman's milk.

A. Woman's milk.
   1. The sugar content is high; the ash and protein content low.
   2. The composition of the protein differs in the relatively high percentage of soluble protein or lactalbumin.

B. Cow's milk.
   1. Composition of cow's milk is more like woman's milk than the milk of other animals.

B. Cow's milk—Continued.
   2. Cow's milk contains a greater proportion of most of the constituents of milk, but is noticeably deficient in sugar, iron, and the antiscorbutic vitamine. (Water soluble B may be present in variable amount.)
   3. It is generally available in this country.
   4. The upkeep of the cow relative to the amount of yield is less than that of the goat.

C. Goat's milk.
   1. Iron content is said to be like that of woman's milk and is higher than that of cow's milk.
   2. Fat droplets are of small size.
   3. Possibility of goat's milk being infected with tuberculosis is but slight, owing to the relative insusceptibility of the goat to the disease.
   4. Malta fever, which has been reported in Texas, is, however, carried in goat's milk.

D. Ass's milk has been recommended for infant feeding in some parts of Europe on account of its relatively low fat content.

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IV. AVAILABLE FORMS OF COW'S MILK FOR INFANT FEEDING.

(See Section II, Outline 6, Topic II, B.)

Clean, fresh cow's milk is the best available form of milk for children after they are weaned. Pasteurized milk or canned milk may be substituted for it when clean, fresh cow's milk can not be obtained. Milk powder is undoubtedly the best form of canned milk for the use of infants and young children.

A. Raw milk.
B. Pasteurized milk.
C. Canned milk.
   1. Milk powder, or dry milk.
   2. Condensed milk.
   3. Evaporated milk (unsweetened condensed).

READING REFERENCE IV.

Mendenhall, Dorothy Reed: Milk, the Indispensable Food for Children, U. S. Children's Bureau, Publication No. 35, 1918, pp. 14–26.

V. PROPRIETARY INFANT FOODS.

A. Proprietary foods are of two classes:
   1. Milk substitutes, which consist largely of dry milk. (For a description of these milk foods, see Carter, Howe, and Mason.)
   2. Milk modifiers, which do not contain milk in any form.
      (*a*) Preparations containing large amounts of maltose.
      (*b*) Farinaceous foods.
      (*c*) Peptonizing preparations.
      (*d*) Miscellaneous.

B. Disadvantages of proprietary foods.
   1. Milk modifiers may be used through ignorance as a substitute for breast milk, or cow's milk, and the child thereby given a totally inadequate diet.
   2. There is danger from scurvy when foods subjected to a prolonged high temperature in processing are used if some antiscorbutic is not given at the same time.
   3. High price of combined or individual ingredients is a disadvantage.

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VI. PRODUCTION OF CLEAN, PURE COW'S MILK OF GOOD QUALITY DEPENDS CHIEFLY ON:

A. Feeding of the cow.
B. Care of the cow.
C. The milker.
D. The milking utensils.
E. Refrigeration.

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VII. CHOICE OF MILK FOR INFANT USE.

A. Condition of dairy must be ascertained by inspection or inquiry of local board of health.
B. Only the milk of a tuberculin-tested, healthy herd or single cow should be used.
C. Milk should be procured from herd rather than single cow if possible.
D. In cities, certified or pasteurized milk of grade A quality should be purchased.
E. Milk relatively low in butter fats is advisable, at least for the first six months.
F. Milk with higher butter fat may be used for older child and can be used for infant by removing from 1 to 2 tablespoonfuls of cream from the top before using.
G. Bottled milk must be used except where milk is obtained on the premises where it is produced. "Dipped" milk is an unsafe food for young children.
H. When fluid milk of a good quality is not available, milk powder, made of either whole milk or a half skim milk, should be substituted. (Several firms in this country produce a good grade of dry whole milk.)

READING REFERENCE VII.

MENDENHALL, cited above.

VIII. CARE OF MILK IN THE HOME.

A. It should be kept below 50° F. in—
   1. Ice box.
   2. Iceless refrigerator.
   3. Running water.
   4. Outdoors in cold weather.
B. It should be kept in container in which it is delivered, or other clean receptacle.
C. It should be kept covered.

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A Home-Made Refrigerator, U. S. Public Health Service, Public Health Bulletin No. 102, May, 1919.

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IX. METHODS EMPLOYED FOR MAKING RAW MILK SAFE FOR INFANT USE.

On the whole, clean, raw milk, which has been subjected to as few manipulations as possible and which is used in a relatively short time after it is produced, is the ideal form of artificial food and therefore the most desirable for the human infant. It is, however, most difficult to obtain safe raw milk. Even when milk is produced under apparently perfect conditions, the possibility of bacterial contamination can not be entirely eliminated. Transporting and keeping raw milk increases the danger of bacteria possibly present multiplying to a dangerous extent before it is used. For these reasons the heating of milk until the bacteria ordinarily present are killed is now admitted to be the safest procedure. The methods employed for this purpose are pasteurization, which is the process best adapted for commercial use, and boiling or scalding milk. The scalding of milk is the best method for home use.

A. Pasteurization.

1. Pasteurization consists in raising milk to a temperature high enough to kill the ordinary bacteria present and in keeping it at this temperature long enough to insure this. In the best process the milk is brought to a temperature of 145° F. and held at that temperature for 30 minutes.
2. The process, when done properly, destroys 99 per cent of bacteria present in milk and delays the souring.
3. Commercial pasteurization of the milk of all large cities, or of any milk that is to be transported any great distance, or to be kept any considerable length of time is absolutely essential, if milk is to be a safe food for either infants or adults.
4. Disadvantages of pasteurization.
   - (*a*) Pasteurized milk is not sterile; it will not keep sweet unless quickly chilled and kept chilled until used.
   - (*b*) Stale pasteurized milk may be more dangerous than stale raw milk, because putrefaction, if started, will progress rapidly in milk which has been pasteurized.
   - (*c*) In the commercial processing of milk recontamination may occur after it is pasteurized, especially if it is bottled subsequent to pasteurization.

A. Pasteurization—Continued.

4. Disadvantages of pasteurization—Continued.

(*d*) Scurvy. (See Section II, Outline 4, Topic IX.)

(1) New evidence has lately come to hand which apparently establishes the fact that scurvy is due to the absence of a specific vitamine in the food. (See Section II, Outline 2, Topic IV, E, 5 and 6.)

(2) Fresh milk itself is not strongly antiscorbutic.

(3) Formerly it was generally held that vitamines were not appreciably injured by the application of heat. It is now granted that the antiscorbutic vitamine loses its strength when kept or when subjected to heat.

(4) Scurvy does appear on an exclusive diet of pasteurized milk, but the staleness of the milk and not the heat to which it has been subjected may account for the injury to the vitamine.

5. Pasteurizing in the home.

Some physicians prefer to pasteurize all questionable milk, even commercially pasteurized milk, rather than to scald it or bring it to a boil.

(*a*) Apparatus.

(1) Several types of apparatus are on the market.

(2) All have the disadvantage of considerable extra cost and of being relatively intricate.

(*b*) Housewife methods.

(1) Modified milk should be pasteurized in the feeding bottles.

"Place the bottles of milk in a covered pot containing enough tepid water to cover the bottles to the neck. Allow this to stand on the top of a stove until the water begins to simmer. Now remove the pot from the stove to a table and let it stand for 20 minutes covered. Then cool the bottles of milk by placing them first

A. Pasteurization—Continued.

5. Pasteurizing in the home—Continued.

(*b*) Housewife methods—Continued.

in water at room temperature and afterwards in ice water." (See Holt and Howland, p. 155.)

(2) Whole milk may be pasteurized in the milk bottles.

"In a small tin pail place a saucer; on the saucer stand the bottle of milk (leaving the cap on the bottle). Now pour sufficient hot water (not so hot as to break the bottle) into the pail to fill same to within 3 or 4 inches of top of bottle, and then stand the pail and its contents on the stove. The instant the water begins to boil remove the bottle of milk from the pail and cool it as rapidly as possible.

"Keep the bottle of milk in the ice box and keep the cap on the bottle when not in use. When you remove the cap do so with a clean prong and be careful that the milk side of the cap does not come in contact with anything dirty." (See MacNutt, p. 312.)

B. Boiling and scalding.

1. Bringing milk to a temperature of 212° F. on several successive days is the only method of killing all bacterial forms and of rendering milk absolutely sterile.
2. Boiling for five minutes kills all ordinary bacteria and renders milk practically a sterile food.
   (*a*) It is the best method to use for milk known to be contaminated.
   (*b*) It renders milk constipating.
   (*c*) It changes the taste.
   (*d*) It makes the curd more digestible.
   (*e*) It changes the chemical and physical properties of milk.
3. Scalding milk, or bringing it to a boil, kills the germs of disease ordinarily found in milk. (See Klein, p. 205.)
   (*a*) Method.
      (1) Heat the milk over a fire in an open vessel until it bubbles around the

B. Boiling and scalding—Continued.

3. Scalding milk, etc.—Continued.

(*a*) Method—Continued.

edges and steams in the middle (it then reaches a temperature of from 167° to 185° F.).

(*b*) Advantages.

(1) It is easy to do correctly.
(2) It needs no special equipment.
(3) It is not constipating.
(4) There is no change in taste, if not allowed to boil.
(5) The curd of milk is rendered more digestible by heating.
(6) No deleterious physical, or chemical changes occur. There is evidence that even the antiscorbutic vitamine is not injured by this amount of heating.

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X. SOCIAL AND ECONOMIC PROBLEMS AFFECTING THE USE OF MILK.

Milk of good quality should be available for every child in the country; this is possible only if the milk supply is increased. Among the social and economic problems involved in the insuring of an adequate milk supply are:

A. Further education of the public regarding the importance of milk for older children and adults. Most mothers are now aware of the need of the best milk on the market for infant use.

B. Increase of dairy herds and the production of milk. This involves the questions of—

1. Fair return (as distinguished from excess profits) for the production of clean, safe milk of good quality.

2. Economy of production, involving larger dairies, better farming methods, and cooperative buying of grain.

C. Economy of distribution, including—

1. Systematizing of distribution, doing away with the overlapping of delivery routes; possibility of a single milk distribution system, especially in large cities.

2. Elimination of unnecessary waste through breakage and loss.

3. Utilization of surplus fresh milk, especially June milk, for milk powder.

D. The question of the regulation of the price of milk.

E. The question of the sale of milk at cost through community organizations, and the provision of free milk stations.

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OUTLINE 4. ARTIFICIAL FEEDING OF THE INFANT.

The aim in the teaching of the artificial feeding of infants is to advise the use of the food that will prove a success with the average well baby and to advocate the mixture, amount and feeding interval that have been found to give the best results in the largest number of cases. If it is possible, a sick baby, or a baby showing any serious digestive disturbance, should be under the direction of a physician trained in the treatment of the diseases of children, or pediatrics. Without this experience, the management of such feeding cases is too grave a responsibility and the outcome unnecessarily doubtful.

The equipment and routine for food preparation should be simplified and standardized as much as possible, not only to save the time and strength of the mother, but also to insure cleanliness and uniformity of the feeding mixture.

I. PREPARATION OF ARTIFICIAL FOOD.

A. List of equipment:

1. Nursing bottles (6 to 8) holding 8 ounces. There should be at least one more bottle than the number of feedings in 24 hours.
2. Nipples (6 to 8) one for every bottle.
3. Rubber corks, nonabsorbent cotton, or squares of clean wax paper (4 inches square) and rubber bands.
4. Bottle brush.
5. Bottle rack or container. This may be homemade out of any small pail with wires fitted in to separate bottles.
6. Glass graduate (photographer's measuring glass) holding at least 8 ounces and graduated in one-half ounces.
7. Measuring spoons (table, tea and half tea sizes).
8. Mixing spoons (table and tea sizes).
9. Two-quart pitcher for mixing food.
10. Double boiler holding 1 quart.
11. Saucepan to boil water or scald milk.
12. Small glass or enamel ware funnel, if small-mouthed bottles are used.
13. Aluminum cream dipper, holding 1 ounce, if milk is to be skimmed.
14. Flat-bottomed enamel ware soup kettle, fitted with false bottom and holding about 4 gallons (for sterilizing utensils).
15. Pint cup for warming bottle, fitted with false bottom.

B. Selection of equipment.

1. If possible a mother should provide herself with the proper utensils for putting up artificial food, and these should be kept solely for this purpose. A proper equipment, although it may cost a few extra dollars, saves in the time and the ease with which the food can be modified for the baby.
2. In selecting the nursery bottles, care must be taken that every part of the inside can be easily reached with the bottle brush. The bottom corners must be round; if there is a neck, it must have a gradual slope. In choosing a nipple, it is essential that it can be easily turned inside out, so that it can be thoroughly cleaned. Nipples may be bought without holes, and one or two holes made at the top with a fine cambric needle heated for the purpose. The hole should be large enough to allow the milk to drop rapidly but not large enough to form a steady stream when inverted.

B. Selection of equipment—Continued.

3. The double boiler, saucepan, and mixing pitcher may be purchased in enamel, or agate ware. The soup kettle (with a tightly fitting cover) may be purchased at any good hardware store and fitted with a false botton made of a galvanized-iron disk perforated with holes and raised at least 1 inch from the bottom of the kettle. This kettle which may be improvised out of any large kettle, or even a small boiler, is used to sterilize all the utensils needed in the preparation of food, and can also be used to hold clean empty bottles and nipples after the food is put up. It may also serve as a pasteurizer.

C. Preparation of bottle feedings. (See Bottle Feeding, U. S. Children's Bureau, Dodger No. 5, 1919; The Preparation of Artificial Food, U. S. Children's Bureau, Dodger No. 6, 1919.)

1. Preliminary preparation.
   - (*a*) Wash all bottles, nipples, and utensils.
   - (*b*) Sterilize all bottles, nipples, and utensils.
   - (*c*) Prepare boiled water, cereal water, or gruel.
   - (*d*) Open milk bottle, first wiping off cap, or top and rim of bottle.
   - (*e*) Scald milk (when not certified, or pasteurized).
2. Mixing food.
   - (*a*) Remove utensils from sterilizer.
   - (*b*) Measure sugar, place in graduate, dissolve it in hot water and empty into mixing pitcher.
   - (*c*) Measure boiled water or cereal water and empty into mixing pitcher.
   - (*d*) Measure milk and empty into mixing pitcher.
   - (*e*) Stir contents of mixing pitcher.
3. Filling the bottles.
   - (*a*) Measure in graduate amount for each bottle.
   - (*b*) Stopper bottles with sterilized corks, or absorbent cotton; or cover with sterilized paper and rubber band, or old sterilized nipples.

D. Care of bottles.

1. Filled bottles.
   - (*a*) Cool the contents quickly by standing bottles in ice water or running water.
   - (*b*) Keep cold (below 50° F.) by placing on ice, in iceless refrigerator, in running water or outdoors.

D. Care of bottles—Continued.

2. Used bottles and nipples.

(*a*) Empty and rinse bottle thoroughly, turning nipple wrong side out.

(*b*) Fill bottle with water, turning nipple upside down in top.

(*c*) Wash bottles and nipples once a day, using hot water, soap, and a bottle brush; rinse in clear hot water.

(*d*) Sterilize five minutes by steaming, or by boiling in hot water, before using any bottle or nipple.

(*e*) Keep clean sterilized bottles and nipples in covered sterilizer; nipples may be kept in clean Mason jar.

II. DIRECTIONS FOR GIVING THE BOTTLE.

A. Preliminary preparation.

1. Take from ice box.
2. Remove stopper or cover.
3. Put on clean, sterilized nipple.
4. Heat to temperature of 100° F. (avoid overheating or boiling).

B. Position of child.

1. Young infant should be held, or should be on its side in the crib, while the bottle is held for it.
2. Older infant may hold its own bottle, but should be watched while taking the bottle.
3. An infant troubled with gas should take bottle in a semi-upright position.
4. After feeding, the infant should be raised gently to the mother's shoulder and patted several times on the back with the flat of the hand. This will bring up any gas present, or air swallowed while feeding. Babies may be taken up during nursing for the same purpose.

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III. MODIFICATION OF COW'S MILK.

Milk is said to be modified when it is so altered as to render it better suited to the infant digestion. Formerly intricate and difficult methods were used in the mistaken effort to make cow's milk similar to mother's milk from a chemical standpoint. It is now known that chemical similarity of foods does not necessarily mean equal digestibility. At the present time the modification of milk is usually a simple process. It is diluted with more or less boiled water, according to the age of the baby, and some sugar is added.

A. Milk that is to be modified may be—

1. Top milk.
   - (*a*) The top half of the contents of an ordinary quart bottle of milk, which is obtained by siphoning or by means of the Chapin cream dipper, contains about 7 per cent fat (the ratio of fat to protein in mixtures of 7 per cent milk is about 2 to 1).
   - (*b*) The top third of the contents of an ordinary quart bottle of milk contains about 10 per cent fat (the ratio of fat to protein in mixtures of 10 per cent milk is about 3 to 1).
2. Skim milk.
   - (*a*) Skim milk when obtained by removing the gravity cream from a quart bottle of milk contains approximately 1 per cent fat (the ratio of fat to protein in pure skim milk mixtures is very low).
   - (*b*) Skim milk so obtained may be combined with the cream removed from the same bottle and mixtures of low fat and high protein thereby obtained. (See Daniels and English, p. 216.)
3. Whole milk.
   - (*a*) An entire quart bottle of milk shaken so that the cream is evenly distributed.
   - (*b*) A quart of freshly milked milk (the ratio of fat—3.5 to 4 per cent—to protein is nearly equal in mixtures made of whole milk, except when the milk used has an unusually high butter fat).

B. Advantages of whole milk mixtures.

1. They are the easiest modifications to prepare.
2. There is less danger of error in ignorant, careless, or inexperienced hands.

B. Advantages of whole milk mixtures—Continued.

3. Mixtures show less fluctuation in percentage composition.
4. Digestive disturbances are less likely to occur than on mixtures with a high fat ratio.
5. Gain in weight on these mixtures may not be at first so rapid as on mixtures containing more fat, but the average infant will gain normally on such modifications given in the proper amounts.
6. They are cheaper than top milk mixtures, when a large amount of food is required, as only 1 quart of milk is needed.

C. Preparation of whole milk mixtures.

1. The total 24-hour amount of food should be put up at one time. Where the facilities for keeping milk are poor it may be preferable to put up the milk twice a day, especially if fresh milk from the morning and evening milkings can be obtained.
2. If only one or two bottles of artificial food are needed, it is safer to make at least a 10-ounce mixture, as there is a greater danger of differences in percentage composition if small amounts are mixed.
3. The amount of milk to be given daily to a well infant under 1 year of age should be about 1½ ounces per pound of body weight. It is safer to begin with 1 ounce of milk when weaning an infant, especially when it is very young. (See Section II, Outline 2, Topic IV.)
   (*a*) This amount (1½ ounces) amply covers the protein requirement for tissue growth and tissue renewal.
   (*b*) The amount of fat contained in 1½ ounces of whole milk (3.5 to 4 per cent) is sufficient to cover the fat need of the infant and can, as a rule, be easily digested.
   (*c*) To make up the caloric value of the food, less than this amount of milk per pound of body weight necessitates giving a larger percentage of carbohydrates than is usually wise.
   (*d*) More than this (up to 2 ounces per pound of body weight) may be needed by some infants, especially in the early months of life, but the larger the amount of milk, the higher the percentage of fat in the food and the greater the danger of upset.

C. Preparation of whole milk mixtures—Continued.

3. The amount of milk to be given, etc.—Continued.

(*e*) No infant should be given more than 2 ounces of whole milk per pound body weight, except under the direction of a pediatrist.

(*f*) No infant at any age should be given more than 1 quart of whole milk in 24 hours.

4. Scald or pasteurize the milk before modifying it, unless the cow or dairy is under personal supervision. If the milk is hot, it can be diluted with boiling water or hot cereal water or gruel, and the mixture then cooled. If cold milk is used, the cereal water used to dilute it may be cooled. Gruels, however, usually have to be stirred into cold milk while they are hot, or the mixture will be lumpy.

5. Carbohydrates. (See Section II, Outline 2, Topic IV, C.)

(*a*) Sugar.

(1) Sugar is added to give additional calories, usually up to 6 per cent of the total mixture. It is well to try cane sugar, as it is cheapest, and change to either milk sugar, or a dextrin-maltose mixture, if any disturbance from sugar is shown.

(2) For a well baby of average size, milk sugar may be added to the daily food in the following amounts according to the age:

(*a*) One-third ounce, or 3 teaspoonfuls, at 2 weeks.

(*b*) Two-thirds ounce, or 6 teaspoonfuls, at 1 month.

(*c*) One ounce, or 9 teaspoonfuls, at 2 months.

(*d*) One and one-third ounces, or 12 teaspoonfuls, at 2 to 9 months.

(*e*) One ounce, or 9 teaspoonfuls, at 10 months.

(3) After the tenth month the sugar should be gradually diminished, until when whole milk is given no sugar is added.

C. Preparation of whole milk mixtures—Continued.

5. Carbohydrates—Continued.

(4) The same amount of dextrin-maltose is given as of milk sugar, but as cane sugar is heavier, only two-thirds of the number of teaspoonfuls is required. (See Table 1.)

(*b*) Starch.

Cereal water instead of boiled water should be used after the second month. (For the amount of starch to be given during the first year, see Section II, Outline 2, Topic IV, C, 6, b.)

(1) A small amount of starch increases the digestibility of the casein. Scalding or boiling the milk also produces a more digestible curd. (See Section II, Outline 2, Topic IV, A, 4, b.)

(2) Larger amounts of starch increase appreciably the calories of the food.

(3) The vitamine, mineral, and protein content of cereals are of considerable nutritive value.

(4) Starch is usually well digested by infants, if not given in excessive amounts.

(5) The use of cereal water and gruel is helpful in constipation.

6. The number of ounces of water to be added to the amount of whole milk to make enough food for 24 hours can be determined by multiplying the desired number of feedings by the amount of each feeding and by subtracting from this sum the number of ounces of whole milk.

7. The caloric value of the modification made should be calculated as a check on the amount of food to prevent underfeeding or overfeeding, but calorimetric estimation should not be used as a method of feeding. (See Holt, p. 187.)

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TABLE X.—*Approximate energy value and measurement per ounce weight of foods used in modifying milk.*

Food.	Approximate calories per ounce weight.[1]	Level teaspoonfuls per ounce weight.
Whole milk (4 per cent fat)	20	6
Top milk (7 per cent fat)[2]	30	6
Skimmed milk	15	6
Buttermilk	10	6
Whey	5	6
Milk sugar	120	9
Cane sugar	120	6
Malt sugar (dextri maltose)	120	9
Oatmeal	115	9
Wheat flour	100	12
Barley flour	100	12

[1] A large calorie is the unit adopted by the physiologist to measure the fuel or energy value of our food.
[2] The upper half of a quart bottle of milk removed with a milk dipper gives a 7 per cent top milk.

IV. FEEDING INTERVAL.

A. The infant should be fed regularly by the clock during the daytime in order to promote proper digestion and to train it to wake at meal time and to sleep a long unbroken interval at night.

B. This regularity should be established during the first weeks of life.

C. No interval shorter than three hours is advisable for any infant, whether breast fed or bottle fed.

1. A shorter interval is unnecessary, for the infant can be trained to go without food comfortably for this length of time.
2. It is unwise, for the stomach is not empty under three hours, often longer.
3. It is more difficult for the mother in arranging her work and the daily routine of the infant.

D. The four-hour interval.

This is now preferred by many physicians from birth on, for the following reasons:

1. The stomach is empty or nearly empty of the previous meal.
2. The danger and the discomforts of overfeeding are prevented.
3. No less food is taken than with the three-hour interval.
4. It is safer for bottle-fed babies fed on cow's milk.
5. Larger amounts at a single feeding and a stronger mixture are tolerated.
6. It is easier for the mother.

E. All infants started on a three-hour interval should be changed to a four-hour interval by at least the fifth month.

F. Feeding at night.
   1. During the first months of life a well baby should be accustomed to not more than two feedings between 6 p. m. and 6 a. m.
   2. After the third month of life not more than one feeding between 6 p. m. and 6 a. m. should be given (this is usually given at 10 p. m.).
   3. Many infants require this one night feeding until the second year, otherwise they wake at such an early hour that the mother is deprived of her rest.
   4. At any time during the first year well, strong infants may voluntarily do without any feeding between 6 p. m. and 6 a. m. (this should be the rule by at least 18 months of age).

G. During the second year most infants require only four feedings in 24 hours. (Some specialists now advocate only three feedings daily at this period.)

H. The best time for the first morning feeding is at 6 a. m., as this brings the last meal at 6 p. m., thus allowing the mother time to nurse or feed the baby and to put it to sleep before the family evening meal.

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MORSE, JOHN LOVETT, *and* TALBOT, FRITZ B.: Diseases of Nutrition and Infant Feeding, The Macmillan Co., New York, 2d edition, 1920, pp. 198–199.

V. AMOUNT OF FOOD GIVEN AT A FEEDING AND TOTAL 24-HOUR AMOUNT.

A. The amount of food varies considerably, according to the age, weight, and digestive capacity of the infant.

B. The best guide is the amount taken by a breast-fed infant at the same age. (See Section I, Outline 7, Topic X; Section II, Outline 2, Topic III, C, 2, a.)

C. More food can be given at a single feeding with a long feeding interval.

D. Ordinarily during the first 5 months of life, about 2 more ounces can be given in each bottle than the number of months the infant is old. After 6 months, a mixed diet is generally begun.

TABLE XI.—*Average amount in ounces taken at one feeding and in total 24 hours.*[1]

Period.	Quantity for one feeding.	Quantity for 24 hours.
	Ounces.	*Ounces.*
Second to seventh day	1 -2	7 -14
Second, third, and fourth week	2½-4½	18 -32
Second and third month	3½-5	24 -35
Fourth and fifth month	5 -6½	30 -36
Sixth, seventh, and eighth month	6½-7½	32½-37½
Ninth and tenth month	7 -8	35 -40
Eleventh and twelfth month	8 -9	40 -45

[1] From Holt and Howland, p. 189.

READING REFERENCES V.

GRULEE, cited above, pp. 156–157.
HOLT and HOWLAND, cited above, pp. 189–190.
Infant care, cited above (revised), pp. 70–72.

VI. METHOD OF INCREASING THE FOOD.

A. Bottle feeding.

1. With small feeble infants and all very young infants, mixtures containing only a small amount of milk and little or no sugar must be given first, and the food strengthened slowly.
2. It is more important to avoid digestive disturbances in a young baby that must be artificially fed than to produce a normal gain in weight.
3. In strengthening the food, do not increase more than one ingredient on any one day. Alternate the increase in milk, or sugar, or starch, and allow an interval of one or two days to elapse between these increases.
4. The quantity given at each feeding and the strength of the mixture given should not be increased at the same time, but the increases should alternate, allowing a few days to elapse between the changes. When increasing the quantity of food, it is best to make the increase at first entirely in the diluent, and then gradually to replace this with milk.
5. In increasing the food, small changes should be made. In the early months not more than 1 ounce of milk should be added at a time to the total 24-hour amount, and not more than a half ounce more in quantity should be given at each feeding.
6. The digestive condition, length of time the food satisfies the baby, and the gain in weight should be taken into consideration in increasing the food. The food should

A. Bottle feeding—Continued.

not be strengthened if the child is not digesting well, even if there is no gain in weight.

7. Usually the food needs to be increased once a week, or oftener in the early months. A child taking an adequate amount of milk and making regular satisfactory gains in weight need not have the food changed.

B. Mixed feeding.

The advantage of early supplementing the milk diet with fruit, cereal, vegetable, and egg is being increasingly appreciated.

1. Orange juice, or some other antiscorbutic, should be given to an artificially fed baby after the third month, and to a breast-fed child by the sixth month.
   (*a*) Only ½ teaspoonful should be given daily at first. This amount should be increased rapidly to 3 teaspoonfuls; at 6 months, 2 tablespoonfuls should be given. From 1 to 2 ounces may be given at 1 year.
   (*b*) It should always be diluted with an equivalent amount of water, and should be strained for young babies. The pulp may be given with the juice after the first year.
   (*c*) It should be given on an empty stomach one-half hour before a bottle feeding.
   (*d*) It may be given from a bottle or a spoon. Older children can drink it from a glass.
   (*e*) Canned tomato juice is now recommended as a substitute for orange juice and has the great recommendation of being less expensive. (See Section II, Outline 2, Topic IV, E, 6, b, (2).)
   (*f*) Both orange and tomato furnish considerable iron and water soluble "B" vitamine.
2. Vegetables either in the form of the juice of fresh vegetables, or strained vegetable soup, or puree, or mashed vegetable pulp are now given to young infants at the end of the first year to furnish additional minerals and vitamines. (See Section II, Outline 5, Topic II, B, 4.) When vegetables form a considerable part of the diet they also supply some protein and increase the total caloric value of the food.
   (*a*) The juice of raw, scraped turnip, or swede, is highly antiscorbutic, having over half the potency of orange juice. (See Section II, Outline 2, Topic IV, E, 6, b, (2).)

B. Mixed feeding—Continued.

2. Vegetables, etc.—Continued.

(*b*) Any vegetable may be used in the form of strained soup. Green, leafy vegetables and roots have a higher nutritive value than tubers. Spinach, carrots, and cabbage have been found to contain all three known vitamines. Spinach affords the greatest amount of iron.

TABLE XII.—*Protein and mineral constituents in grams per 100 calories of the edible portion of certain vegetables.*[1]

Vegetable.	Protein.	Calcium (Ca).	Phosphorus (P).	Iron (Fe).	CaO.	P_2O_5.	100 Calorie portion (fresh).
	Grams.	*Grams.*	*Grams.*	*Grams.*	*Grams.*	*Grams.*	*Grams.*
Asparagus	8.10	0.122	0.177	0.0045	0.171	0.405	450
Beans, string	5.55	.110	.126	.0027	.154	.289	241
Beets	3.47	.064	.084	.0013	.089	.192	217
Cabbage	5.07	.143	.092	.0035	.200	.210	217
Carrots	2.42	.124	.101	.0013	.173	.232	221
Cauliflower	5.90	.403	.200	.0020	.564	.459	328
Celery	1.28	.421	.201	.0027	.589	.460	542
Potato, white	2.65	.016	.069	.00156	.023	.158	120
Spinach	8.79	.281	.285	.01506	.393	.653	417
Turnip	3.30	.161	.117	.00127	.226	.269	256

[1] Adapted from Sherman, Henry C.: Chemistry of Food and Nutrition, The Macmillan Co., New York, 1918, pp. 410-420; 427-431.

(*c*) A good vegetable soup is made by using 1 cup each of diced carrots and turnips, a handful of spinach or celery, 1 teaspoonful of salt, and water to cover. A soup bone or from one-half to 1 cup of finely divided meat may be cooked with the vegetables. In making the soup, cut the vegetables very fine or put them through a meat chopper. Cook until tender, in an uncovered vessel, and after straining press the vegetables until the soup is cloudy.

(*d*) This vegetable water or soup may be used as early as the sixth month and should be given once a day during the second and third six months of life. (See Section II, Outline 2, Topic IV, D, 7 and 9.)

(*e*) At first an ounce of vegetable water may be given, either in the bottle, from a cup, or with finely divided bread crumbs, or rice cooked until it is soft. During the last part of the first year, from 1 to 3 ounces of soup should be

B. Mixed feeding—Continued.

2. Vegetables, etc.—Continued.

given before one of the regular bottle feedings. By the end of the first year from 1 to 3 level teaspoonfuls of the pulp may be given in the liquid.

3. Cereal, bread, and other starchy foods.

(*a*) Cereal.

(1) Well cooked cereal may be fed to well infants at any time during the last half of the first year.

(2) From 1 to 2 tablespoonfuls of cereal are given with a little milk from the bottle feeding poured over it. During the second year from 2 to 4 tablespoonfuls of cereal may be given once or twice a day.

(3) Cereal should be given at first once a day at a regular feeding time, and should be followed by the rest of the bottle.

(4) Cereals made from the whole grain have a higher mineral and vitamine content than other cereals. They must of course be given at first strained, but infants soon learn to take care of the cellulose. Oatmeal has probably the highest nutritive value of the cereals.

(5) When the infant is taking a good-sized dish of cereal once a day, if it is necessary to dilute the milk, boiled water may be substituted for cereal water for this purpose.

(*b*) Bread.

(1) A thin half slice of bread dried in the oven may be given to a well child before the end of the first year.

(2) One or two half slices may be allowed a year-old baby and should be given either before or after a regular feeding.

(3) Bread made out of graham or whole wheat flour can be easily digested by healthy children in the second

B. Mixed feeding—Continued.

3. Cereal, bread, and other starchy foods—Continued.

(*b*) Bread—Continued.

year. Such bread has a higher nutritive value and also has a laxative action often desirable.

(4) Commercial zwiebach and crackers should not be given to an infant.

(*c*) Potato.

(1) Baked potato may be given to a baby during the second year. (Some infants have great difficulty in digesting the starch of potato.)

(2) White potato is a valuable source of minerals and the two water-soluble vitamines, and has the valuable attribute of yielding an alkaline residue.

(3) It should, however, not be considered as an equivalent for green vegetables, but used as a carbohydrate food, and as a substitute for well-cooked rice or macaroni.

(*d*) Rice and macaroni.

(1) If cooked until soft, these foods offer an acceptable change in the diet and are especially useful as an addition to soup.

(2) They are so easily and quickly cooked that they are more economical than potato, if the oven has to be used for one potato.

4. Egg.

There is no food about which more difference of opinion exists than egg. Exceptionally an infant exhibits an idiosyncrasy to egg albumin, and eggs have to be omitted from the diet for a number of years. The yolk of egg is the most valuable part of the egg and can usually be taken by young, healthy infants with profit and without causing any disturbance. If children can not take egg, they should be given meat during the second year.

(*a*) The yolk of egg contains a large percentage of fat, the fat-soluble and the water-soluble vitamines, and considerable valuable mineral mat-

B. Mixed feeding—Continued.

4. Egg—Continued.

ter, especially iron and phosphorus. The yolk of an egg contains about the same amount of fat (5 grams) as 2 to 3 slices of crisp bacon. The fat of egg yolk is in a most easily digested form and contains the fat-soluble vitamine which is lacking in pork fat.

(*b*) It may be begun at any time during the second six months for artificially fed infants and should be given regularly during the second year.

(*c*) It should be begun with very small amounts, a salt spoonful once a day in a bottle feeding, gradually increasing to 1 teaspoonful, and then to half a yolk. A whole raw egg yolk mixed in the 24-hour milk mixture may be given by the end of the first year. Yolk of egg hard boiled and grated is also usually digested easily during the second six months.

(*d*) During the second year one whole egg a day may be given either coddled, poached, or beaten in the hot soup.

(*e*) The white of egg usually causes more difficulty than the yolk, if the yolk is not given in too large doses. It need not be given until the second or third year, as the child receives plenty of animal protein in the milk.

(*f*) The white of egg if given raw to infants with intestinal indigestion may be absorbed and cause serious disturbance.

5. Meat.

(*a*) Beef juice, which is so frequently given during the end of the first and during the second year, is of questionable value. As a source of iron, beef does surpass other foods which can be used during this period. Spinach and eggs, however, contain iron in a more utilizable form than the iron of the blood. The extractives of meat contain stimulating properties not desirable for young children. Beef juice is much more expensive than vegetable soup, more difficult to keep, and can not be used safely in warm weather. (See Section II, Outline 5, Topic II, B, 4.)

B. Mixed feeding—Continued.

5. Meat—Continued.

(*b*) Meat may be used in the preparation of soup during the second half of the first year and the second year of life, but it is not necessary if vegetables and egg yolk are given.

(*c*) Finely divided meat, either well-cooked beef, chicken, or lamb, 1 teaspoonful to 1 tablespoonful daily, may be given to infants at the end of the second year, but it is not necessary if an egg is given daily, and plenty of milk and green vegetables are included in the diet.

(*d*) Bacon cooked until it is crisp is an appetizing addition to the diet that may be made at any time during the second year. A little bacon is often most helpful, if given in combination with less well-liked vegetables.

(*e*) When good fresh fish can be obtained, from 1 to 2 tablespoonfuls of cod, bluefish, or any delicate fish may be allowed daily. Fish rich in oil, such as mackerel or salmon, should not be given an infant, but may be given to older children. Dark-meated fish and fish rich in oil have a higher nutritive value than white-meated fish, as they contain considerable fat-soluble vitamine.

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Infant care (revised), cited above, pp. 71–72, 76–79.

VII. FEEDING SCHEDULE.

A schedule of the meals of an artificially fed infant for each month of the first year and for three-month age periods during the second year should be made out, giving hours of feeding, amount and kind of food given, and caloric value of daily intake.

READING REFERENCES VII.

Holt *and* Howland, cited above, pp. 209–211.

Infant care (revised), cited above, pp. 74–76, 78–79.

VIII. COMMON DISTURBANCES OF THE ARTIFICIALLY FED INFANT.

A. One of the outstanding features of infant feeding is the fact that babies fed on woman's milk rarely fail to thrive, while those given cow's milk often fail to do so.

B. Digestive disturbances of the artificially fed infant usually are due to—

1. Crowding the feeding intervals too close together.
2. Giving too large an amount of food at each feeding.
3. Giving too much of any one of the chief constituents of the food, especially fat or sugar.
4. Giving too little of any one of the chief constituents of the food, especially carbohydrates or vitamines.
5. A combination of two or more of the above.

C. Following sooner or later on a dietary error, any one of a number of symptoms or combination of symptoms may appear.

1. Vomiting.
2. Gas.
3. Colic and flatulence.
4. Stools full of undigested "curds," either of fat or protein.
5. Loose stools, frequently green and sour.
6. Diarrhea.
7. Large, dry, whitish stools ("soap stools").
8. Constipation with small stools of normal appearance.
9. No gain in weight.
10. Loss in weight.
11. Increased fretfulness and crying.
12. Disturbed sleep.

D. The result of a continuation of a mistake in feeding varies with the individual child and the seriousness of the error.

1. Many infants gradually overcome digestive difficulties as they grow older and thrive in spite of them.
2. Other children grow gradually worse and a serious condition may develop, such as:
   (*a*) Chronic weight disturbance.
   (*b*) Chronic indigestion (dyspepsia) with intolerance to fat, sugar, or starch.
   (*c*) Atrophy or chronic malnutrition.
   (*d*) Summer diarrhea.
3. The outcome depends on the degree of intolerance developed to the chief food constituents, the rapidity with which the cause of the condition is diagnosed, the skill with which the food of the sick child is adapted to his weakened powers of digestion, absorption and metabolism, and the native vigor of the infant.

D. The result of a continuation of a mistake in feeding, etc.—Contd.

4. A large proportion of the deaths during the first two years of life, grouped under the heading of diarrhea and enteritis, are caused primarily by premature weaning and improper artificial feeding. (Diarrhea and enteritis were the cause of 48,231 deaths under 2 years of age in the United States death registration area in 1917.)

5. The effect of these serious nutritive disturbances in infancy must be most deleterious to the future physical and mental development of the individual. Many abnormalities in the adult can be traced to improper feeding in infancy and early childhood.

READING REFERENCES VIII.

GRULEE, cited above, pp. 166–178.
HOLT *and* HOWLAND, cited above, pp. 192–196.
Infant care (revised), cited above, p. 74.

IX. NUTRITIONAL DISEASES.

A. Rickets.

Rickets is one of the most common diseases of childhood and is probably the most potent factor in interfering with the efficiency of the race. It stunts growth and causes deformities, some of which greatly increase the dangers of childbearing; and it raises considerably the mortality rate of such diseases as measles and whooping cough.

1. Nature.

(*a*) A deficiency of calcium in the bones is the most striking characteristic of the disease.

(1) Three theories have been advanced to explain this:

(*a*) Lack of sufficient calcium in the food. (This theory is not supported.)

(*b*) Increased excretion of calcium as a result of disturbances of digestion.

(*c*) Increased excretion of calcium because the bones are incapable of absorbing it.

(2) The last theory is considered the most tenable.

A. Rickets—Continued.

1. Nature—Continued.

(*b*) The cause of rickets has baffled scientists of several generations, and is not yet settled. Of the theories advanced, the following are the most tenable:

(1) Dietary origin.

(*a*) The occurrence of rickets preponderately in artificially fed children, and the most severe forms in children fed the proprietary foods low in fat and high in carbohydrate, such as sweetened condensed milk, has emphasized the dietetic factor.

(*b*) The English school believes that rickets is probably a true deficiency disease due to lack of fat-soluble A, comparable to beri-beri, scurvy, or xerophthalmia.

(*c*) Others, however, think that a deficiency of fat-soluble vitamine alone is not sufficient to produce rickets. (See Hess and Unger, "The clinical rôle of fat-soluble vitamine—its relation to rickets," p. 217; also McCollum, Simmonds, and Parsons.)

(*d*) There is experimental evidence to show that several dietary factors acting in combination are involved, namely:

i. Low fat.

ii. Low fat-soluble vitamine.

iii. Low calcium content.

iv. Poor quality of protein.

v. Unsatisfactory salt combinations.

(2) Defective hygiene.

(*a*) Studies show that the rôle played by this factor can not be ignored, at least as a predisposing cause. (See

A. Rickets—Continued.

1. Nature—Continued.

(2) Defective hygiene—Continued.

Great Britain National Health Insurance Joint Committee, A Study of Social and Economic Factors in the Causation of Rickets.)

2. Symptoms.

(*a*) Rickets occurs chiefly between the ages of 6 and 18 months.

(*b*) It has a characteristic picture, varying according to mildness or severity of disease.

(1) Headsweating.
(2) Restlessness.
(3) Constipation.
(4) Large square head.
(5) Beaded ribs.
(6) Swollen epiphyses at ankles and wrists.
(7) Pot-belly.
(8) Curvature of long bones of extremities.
(9) Curvature of spine (dorsal hyphosis).

3. Prevention.

(*a*) Hygienic surroundings.
(*b*) Adequate diet.

4. Treatment.

(*a*) Improvement of hygienic conditions.
(*b*) Special attention to diet as to adequacy, supply of fat, fat-soluble vitamine, calcium, and protein.
(*c*) Cod liver oil and phosphorus.
(*d*) Orthopedic care of deformities.

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B. Scurvy.

Scurvy is a nutritional disease characterized by malnutrition and hemorrhages under the periosteum of the bones, between the muscles, around the joints, under the skin, and in the mucous membranes.

1. Cause.

(*a*) Deficiency in the diet of water-soluble vitamine "C." (See Section II, Outline 2, Topic IV, E.)

(1) Even before the vitamine nature of the disease was clearly demonstrated, clinical evidence showed the connection between the feeding of the proprietary infant foods, condensed and sterilized milk and the development of scurvy.

(2) It may occur whenever there is a lack of the antiscorbutic vitamine in a food.

(*a*) In breast-fed children, if their mothers are fed a "vitamine-less" diet.

(*b*) In infants fed cow's milk—

i. Extremely diluted.

ii. In which the vitamine content has been diminished or destroyed by age, by heat, or by chemi-

B. Scurvy—Continued.

1. Cause—Continued.

(*a*) Deficiency in the diet—Continued.

(2) It may occur—Continued.

(*b*) In infants fed—Continued.

cals (notably the alkalization of milk).

iii. In which the original vitamine content was low, such as milk from animals whose food has not contained roots and greens.

(*c*) In infants fed proprietary foods—

i. In which the vitamine is naturally lacking, as in carbohydrate foods.

ii. In which the vitamine has been injured in processing the food.

(*b*) Predisposition, that is a special susceptibility to deficiency in antiscorbutic vitamine. (This cause is unquestionable.)

(1) In twins fed exactly the same diet one may show flagrant symptoms, the other subacute or no symptoms whatever of scurvy.

2. Symptoms.

(*a*) Occurrence.

(1) Scurvy may occur at any age.

(2) It occurs most frequently between the seventh and tenth months, suggesting an association with the change from breast to bottle milk, and the transition from a liquid to a solid diet.

(*b*) The picture in the outspoken disease shows—

(1) Pallor.

(2) Fretfulness.

(3) Stationary weight.

(4) Tenderness and soreness of extremities.

(5) Swelling of joints.

(6) Skin hemorrhages.

(7) Spongy bleeding gums.

B. Scurvy—Continued.

2. Symptoms—Continued.

(*c*) In the subacute disease there may be few symptoms other than failing nutrition and fretfulness.

3. Prevention.

(*a*) Fruit juices for all artificially fed infants and for breast-fed babies after the first few months of life.

4. Treatment.

(*a*) Food rich in water-soluble vitamine "C." (Orange or lemon juice is the best. See Section II, Outline 2, Topic IV, E, Table VIII.)

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OUTLINE 5. CARE AND FEEDING OF THE CHILD OF PRESCHOOL AGE (2 TO 6 YEARS).

Much of the present children's health movement had its origin in the reaction of the public to the serious conditions regarding the health of the preschool child laid bare by the survey in which the Nation took part during the weighing and measuring test of 1918.

The first six years are the transition period between infancy and childhood, when proper food habits have to be acquired, and when infectious disease, as yet quite unchecked, takes its largest toll of young lives or leaves in its wake serious physical defect or injury. (See Section III, Outline 3, Topic I.) These years have been called the neglected period, because the parents, busy with the care of younger children, often leave the little runabouts to look after themselves. The State at this period has not assumed any direction or control over their development. Improper health habits, malnutrition, or physical defects acquired at this time are carried over to the school age, and if not corrected then may affect the life and health of the adult.

The physical care of the young child should be based on a knowledge of its physical and mental development, its food and health needs, and the special dangers peculiar to this period of life.

I. PHYSICAL AND MENTAL CHANGES DURING THE PRESCHOOL AGE.

A. The early accelerated period of growth is continued through most of this period. (See Section II, Outline 1, Topic IV, A and B, 1.)

B. The annual increase in weight should be about 5 pounds, and the increase in height nearly 3 inches. (See Section II, Outline 1, Topic VII, C.)

C. The growth of the organs of the body which accompanies the change in stature though invisible is of equal importance.

D. The marked development of muscular and body control is associated with enormous sensory and mental development. Concepts of the outside world and means of measuring new impressions are established, a spoken language is acquired, the shaping of the character and the formation of habits which mould the future life of the individual are brought about in these years. (See Section IV, Outline 2.)

II. FEEDING THE YOUNG CHILD BETWEEN 2 AND 6 YEARS OF AGE.

(See Section II, Outline 4, Topic VI, B.)

In the case of a normal, healthy child, the transition between a liquid and a semisolid diet should be accomplished by the end of the second year. A properly fed child at this age should be taking a mixed diet containing food from all five principal food groups. (See Hunt and Atwater, I, p. 8.) The chief essentials in the diet are:

A. A generous amount of food.

The daily allowance of food must be ample throughout the growing period. There has been an unwise tendency in the past to consider children as small editions of grown-ups, and to allow them proportionately too small an amount of food.

A. A generous amount of food—Continued.

1. The minimum food allowance for children under 6 years of age has been set at 50 per cent of the minimum food requirement of an average man, or 1,500 calories (net), by the Inter-Allied Scientific Food Commission of 1918. (See Lusk, p. 259.)
2. The energy requirement per pound of body weight is about 40 calories during the second year; probably a normally active, well child needs no less than this during the years between 2 and 6.
3. An active child needs more food than a quiet child of the same age, and a well-fed child is usually more active than a poorly fed or poorly nourished child. (Activity and an abundant diet are interdependent.)
4. A well child may be given all the plain food he wants to eat at mealtime, if his meals are at regular not too frequent intervals, and if nothing is allowed between meals. (A good appetite is a better guide than a table of calories.)

B. A balanced diet, adequate in character.

The food of a little child must contain a sufficient combination of carbohydrates, fat, protein, and water, and an adequate amount of high-grade protein, essential minerals, and vitamines. (See Section II, Outline 2, Topic IV; also Outline 6, Topic II.)

1. Carbohydrates.
   (*a*) Starch forms the bulk of the food of a small child. A healthy child usually has no difficulty in digesting any form of well-cooked starch. Foods containing much uncooked starch, such as banana, should not be given to young children.
   (*b*) There is a great difference of opinion regarding the amount of sugar that should be allowed young children. Judging by the needs of the infant, the young child should be allowed from 1 to 2 ounces of sugar or simple sweets in the daily food. (Sweets should be given at the end rather than at the beginning of a meal, and should never be given between meals.)
2. Fat should furnish about 35 per cent of the total food calories during the preschool period, or from 40 to 60 grams of fat daily. The infant takes nearly 50 per cent of its nourishment as fat; the adult needs prob-

B. A balanced diet, adequate in character—Continued.

2. Fat, etc.—Continued.

ably less than 25 per cent of the total number of calories in the form of fat.

(*a*) A proper proportion of fat in the diet is necessary, in spite of the fact that fat can be formed from carbohydrate, for the following reasons:

(1) A meal lacking in fat is deficient in staying properties. The digestion of fat is slower, and fat remains longer in the stomach than other foods.

(2) Fat has actually a greater bulk than other foods, for it is not mixed with water.

(3) Weight for weight, fat furnishes twice the calories that carbohydrate or protein does.

(4) The total intake of food may be diminished, if fat is cut out of the diet, for many persons are unable to take enough carbohydrate to make up for a fat deficiency.

(5) If carbohydrate is taken in excess to make up for a fat deficiency serious disturbance due to fermentation or to water retention may follow.

(*b*) The fats, such as milk fat, egg yolk, and fish fat, which are rich in the fat-soluble vitamines, have an added value in the child's diet above their mere energy-producing property. (Cream or butter should be included in a diet where whole milk is not given, but if from 1 to 2 pints of whole milk are taken daily the extra fat needed in the daily diet may consist of any butter substitute or vegetable oil.)

(*c*) The cheaper fats, usually vegetable or nut oils, are digested well by young children.

(*d*) Since uncooked fat is considered more digestible than cooked fat, the extra fat needed in the diet should, for very young children, be added to the food after it is cooked.

3. It is generally considered that sufficient protein is provided when 15 per cent of the total calories are supplied by protein, if at least one-half of the protein is

B. A balanced diet, adequate in character—Continued.

of animal origin. This would mean from 50 to 60 grams of protein in the daily food of the average child between 2 and 6 years of age. According to Camerer the nitrogen-containing food in the child's diet should bear the proportion to the nonnitrogenous food of 1 to 4 or 1 to 5. The adequacy of the protein is, however, almost as important as the amount of protein given, and for this reason the young child's diet should contain an abundance of milk, eggs, and some meat or fish. The value of milk as a source of minerals and as supplementary to the inadequate proteins of grains and legumes should be remembered. (See Section II, Outline 6, Topic II, B.)

4. The essential minerals, specially calcium and iron, are secured if the diet contains plenty of milk and green vegetables.

(*a*) The foods containing iron which are most useful in childhood are spinach and other greens, egg yolk, whole cereals, legumes, and certain fruits, such as oranges and prunes. Lean meat, specially beef, contains considerable iron largely in the form of blood retained in the muscular tissue. (See Section II, Outline 4, Topic VI, B, 5.) Iron in the form of hemoglobin is, however, of a distinctly lower nutritive value than the iron compound of milk, eggs, and foods of vegetable origin. (See Sherman, p. 308.) One-half a cup of cooked spinach has about the same amount of iron as 2½ ounces of uncooked lean beef. In general, any food which contains 0.001 gram of iron in an ordinary serving may be considered a food high in iron.

TABLE XIII.—*Relative amount of iron in ordinary foods.*[1]

Food.	Measure of portion.	Calories.	Iron (gram).
Spinach	½ cup, cooked	25	0.0033
Beef, lean	2½ ounces, uncooked	100	.0032
Beef juice	1 ounce	6	.0019
Egg yolk	1 medium size	50	.0015
Milk	1 cup (8 ounces)	170	.0005
Graham bread	2 small slices	100	.0013
Potato	1 medium size	100	.0015
Oatmeal	⅔ cup thick or 1 cup thin	100	.0009
Prunes	4 or 5	100	.0009
Orange	1 very large size	100	.0004
Orange juice	½ cup	50	.0002

[1] Adapted from Rose and Sherman

B. A balanced diet, adequate in character—Continued.

(*b*) The amount of iron needed by the average man is considered to be 0.015 gram daily. The amount needed by a child between 2 and 6 years of age, if judged relative to weight, would be from one-sixth to one-third of this amount, or possibly from 0.0025 gram to 0.005 gram daily. (There is no doubt, however, that in the growth period, there is greater need for iron than in adult life.) Safety lies in furnishing all essential minerals in large enough quantities to give a wide margin over and above the possible estimated needs.

(*c*) An adult is supposed to require at least 0.67 gram of calcium (or 1 gram of calcium oxide) in his daily food. The intake in infancy necessary for good absorption on a mixed diet has been found to be at least 0.04 gram of calcium oxide per pound of body weight. (See Section II, Outline 2, Topic IV, D, 20.) The young child presumably needs relatively no larger calcium supply than the infant. In general, any food which furnishes in an ordinary serving 0.1 gram of calcium is high in this mineral; a food which furnishes even 0.05 gram of calcium per serving is a valuable food for children. (Milk is evidently the very best source of calcium.)

TABLE XIV.—*Relative amount of calcium in ordinary foods.*[1]

Food.	Measure of portion.	Calories.	Calcium (grams).
Milk	1 cup (8 ounces)	170	0.26
Orange	1 (very large size)	100	.10
Cauliflower	½ cup (cooked)	25	.10
Spinach	do	25	.07
Carrots	do	25	.04
Egg	1 (medium size)	70	.03
Graham bread	2 slices (small)	100	.02
Prunes	4 or 5	100	.018
Oatmeal	⅔ cup (cooked)	100	.017

[1] Adapted from Sherman.

5. An abundance of all three known vitamines should be included in every child's diet. Whole milk, cream or butter, egg, green vegetables, fruits, and whole grains are the best source of vitamines for young

B. A balanced diet, adequate in character—Continued.

children. (A study of vegetables shows that cabbage, carrots, and spinach are the chief vegetables which have as yet been demonstrated to furnish all three vitamines.)

6. Milk or a beverage made of milk should be taken at meal time, and plenty of water to drink between meals. It is a mistake to let children drink a great deal of fluid at the beginning of the meal or to wash their food down with liquids. (If there is any doubt of the purity of the water supply, the water should be boiled for all children.)

C. Choice of food for young children.

1. The food should be plain, easily digested, and simply cooked. This is the period in which proper food habits are largely formed, and it is important that the child's taste should not be perverted, but that a liking for the essential plain articles of diet should be acquired. The daily food should contain—
   (*a*) At least 1 pint of whole milk daily.
   (*b*) Butter or some other form of fat.
   (*c*) Cereal and bread, preferably oatmeal and whole wheat or graham bread.
   (*d*) Green vegetables, especially leaf vegetables.
   (*e*) Fruit.
   (*f*) Egg, meat, or fish. If no one of these three is used, an additional pint of milk should be given.
2. Foods unsuitable for young children (under 7 years).
   (*a*) Fried foods, pastries, rich and elaborately made dishes.
   (*b*) Foods difficult to digest such as hot breads or hot cakes, raw vegetables, corn, pickles, most uncooked fruit, pork (except bacon), sausage, veal, salt or dried fish or dried meat.
   (*c*) Foods that require careful mastication, such as nuts. (Nut paste is a valuable addition to the child's diet.)
   (*d*) Any food which contains a substance injurious to health, such as tea, coffee, or alcoholic drinks.
   (*e*) Any food that is of doubtful purity or that has been injured by age or contamination.

C. Choice of food for young children—Continued.

3. The nutritive value of food may be greatly lessened by the way it is cooked.
   (*a*) Foods soaked in grease are difficult to digest.
   (*b*) Insufficiently cooked cereals and vegetables frequently cause indigestion.
   (*c*) The water in which vegetables are cooked is rich in minerals and vitamines and should be utilized either with the vegetables or in soups.

D. The meals of young children. (See Section II, Outline 6, Topic V.) Three regular, warm meals should be provided daily.

1. A well child between 2 and 6 years of age needs only three meals a day, if the food supplied is abundant. An undernourished or sick child may have to be fed more frequently, since he is unable to take enough food for his needs at the usual meal periods.
2. No candy or sweet drinks should be allowed between meals. A piece of bread may be given between meals, if a child is hungry. (It is wiser not to allow attractive food, such as fruit, which the child may take whether or not he is hungry, and so spoil his appetite for his regular meals.)
3. The meal hour should not be left to chance, but must be settled by the clock. (Irregular meals are almost as disastrous to digestion as eating between meals.)
4. Dinner at midday is necessary for children under 7 years of age; a light supper is better for all young children. (A heavy night meal delays the bed hour and is apt to cause disturbed sleep.)
5. Warm food is more appetizing and is apt to be more digestible than cold food; more food is usually taken if part of it is warm.
6. The day's food should be fairly evenly divided between the three meals. No single meal should be made up of all energy-producing foods or all growth-producing foods, but foods from all five food groups should be represented if possible at each meal.
7. If one meal is slighted regularly, an insufficient daily number of calories is the inevitable result. (A child who eats a hasty, inadequate breakfast because of the hurry to get off to school does not have the energy necessary for the morning's work, and he is too tired to eat well at noon. The same result follows an inadequate or cold lunch, if taken at school or at home.)

D. The meals of young children—Continued.

8. All young children have to be taught to masticate. Some hard food, such as crusts, should be given daily to teach a child to chew and to develop the jaws. (The food should otherwise be finely divided, as children are very apt not to chew sufficiently.)
9. A certain amount of roughage, such as vegetable and fruit fiber, should be gradually introduced into the diet after infancy, because of its effect on constipation. The skin and seeds of fruit are apt to cause digestive disturbances and should be avoided. Uncooked fruit, except fruit juices, should be given very gradually to small children.
10. A well child should be taught to eat what is good for him, but a child with no appetite should not be forced to eat. Food should not be given between meals because it is refused at meal time. (A child too sick to eat should, however, be put to bed.)
11. Good table manners should be acquired during these years. Children copy the manners of grown-ups in their own family, so that it is essential that they see only pleasant ways of eating. Sitting straight in the chair, elbows at the side, the use of the different table utensils, the proper way to hold the utensils, chewing with the lips closed, eating with as little noise as possible, not crowding the food or taking large mouthfuls should be insisted on. (In time these manners will become habitual.)

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III. HEALTH NEEDS, OTHER THAN FOOD.

(See Section I, Outline 8.)

A suitable environment is especially important during infancy, for the young child is an explorer, an active investigator, and every detail of his surroundings is influencing his mental and physical development. (See Section III, Outline 7.)

A. Fresh air.

1. Good house ventilation, especially the free ventilation of sleeping rooms, and outdoor airing is essential for normal growth. (See Section I, Outline 8, Topic VII.)

B. Sleep.

The mental and physical activity of children under 6 years of age is so great that at least half of the day should be spent in recuperating sleep.

1. Ten to twelve hours' sleep at night and, if possible, a nap of from one to two hours in the daytime should be maintained.
2. A regular early bed hour is essential during this period.
3. It is better for every child to sleep in a bed by himself. (See Section I, Outline 8, Topic VI.)

C. Cleanliness.

1. A daily bath is a necessity until the control of the bowels and bladder is fully established. Most well children are better for a daily bath throughout childhood; a tub bath once a week is the minimum requirement.
2. The genitals should be kept scrupulously clean.
   (*a*) The labial folds in a girl should be washed daily, and kept free from secretions. Any discharge should be reported to the physician.
   (*b*) The fore skin of a boy should be pushed completely back daily, or at least twice a week, the exposed part washed gently with clear water, and the fore skin drawn forward again.

C. Cleanliness—Continued.

2. The genitals should be kept scupulously clean—Contd.
   If the fore skin is tight or adherent a physician should be consulted (circumcision is often advisable).
3. Some children acquire control of the bladder at night by the third year; a few do not until the fourth year. Control of the rectum and control of the bladder in the daytime should be acquired before this period. (See Section I, Outline 8, Topic X; also Section IV, Outline 2, Topic 1, A, 3.)
4. The habit of having a natural bowel movement after breakfast every morning should be firmly established, and should be carefully supervised by the mother. (A young child should not be expected to look after himself in fundamental health matters.)
5. The hands and face should be washed before meals and at bedtime, and the hands should always be washed after going to the toilet.
6. The teeth need special care during this period, as the first permanent teeth appear toward the sixth year, and the character of the permanent teeth depends largely on the preservation of the first teeth. The teeth should be brushed at least twice a day, especially before going to bed at night. (The six-year molars are the teeth which usually decay first, probably from neglect.)

D. Clothing.

1. Light, indoor or summer clothing should be suited to the temperature; and for cold weather, warm, outdoor wraps, including suitable foot covering for cold and wet weather, are necessary. (A large amount of "colds" and nose and throat trouble in these early years is attributable to chilling the extremities by getting the feet wet or damp.)
2. Clean, whole garments, and different clothing for night and day is desirable.
3. The underclothing and nightgown should be changed at least weekly, and the stockings at least twice a week.
4. The shoes should be free of holes, should be of ample length, and should fit the feet.

E. Play and physical training.

1. All children past early infancy need opportunity and material for constructive play, and a sympathetic person to direct and supervise their play.

E. Play and physical training—Continued.

(*a*) Under 4 years of age, the period when play is distinctly individual, the ordinary home will furnish all the opportunity needed for indoor play.

(*b*) Between 4 and 6 years of age, the group activities of the kindergarten or play school are helpful.

2. The development of the tactile sense and the imitative or dramatic sense so strong in young children should be utilized at this time.

3. As much of the play should be outdoors as the weather permits. (In northern climates the protected porch or barn should be used in the wintertime for the young child; playing in the snow, and winter sports are usually too taxing during these early years.)

4. The posture and physical development of young children is most neglected. Chest and arm exercises are most needed in this period; and attention should be given to the way the body is held in the sitting and standing positions. Often wrong posture acquired in these early years may last through a lifetime and be a serious handicap to health. (See Section IV, Outline 3, Topic II, F and G.)

5. Instruction in regard to sex should be begun by the mother during this period. (See Section II, Outline 7, Topic III, A; also Section IV, Outline 3, Topic III.) It should consist in—

(*a*) The truthful answering of all questions in regard to the origin of babies or animals. (In the case of the uninquisitive child, it is wise to prepare him for what he will undoubtedly hear outside during the school period, by bringing up the subject of origin of babies and giving a simple account of the matter.)

(*b*) Teaching the child the importance of the genital organs, that they must not be handled, but they must be carefully cleansed daily. (See Topic C, 2.) (Irritation of the genitals should be avoided.)

(*c*) Preventing bad habits by unobstrusive watching of the child during the daytime and when he goes to sleep. (A child should not lie in bed when awake.)

F. Management and discipline. (See Section IV, Outline 3, Topic II.)

1. If parental control is not exercised in infancy, proper discipline throughout childhood is seldom acquired.
2. In teaching the proper health habits in infancy, the child is given its first lessons in obedience and self-control. Learning to sleep, eat, take fresh air and exercise at the proper time is the beginning of discipline.
3. Early commands should be few, but obedience should be insisted on from the first.
4. A mother must consider carefully what is essential for the young child to learn in these early years, but these points should not be many; she should spend her energy striving to develop them, and should ignore many minor matters which time will smooth over.
5. Kindness and courteousness to others, respect for the rights and possessions of others, self-reliance and self-help, truthfulness, and prompt response to a simple command are possibly the chief points to be kept in mind in training children. (See Section IV, Outline 3, Topic II, B, C, D, and H.)

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IV. SPECIAL DANGERS INCIDENT TO THIS PERIOD OF LIFE.

A. The young child is peculiarly susceptible to—

1. Malnutrition and the resultant stunting in growth. (See Roberts.)
2. Nervous shock or fright, shown often in serious nervous manifestations in later life. (See Section IV, Outline 3, Topic II, E.)
3. The acquisition of unfortunate or unpleasant habits of mind or conduct which are eradicated or supplanted with the greatest difficulty. (See Holt and Howland.)
4. Infectious disease, especially respiratory infections, which result in serious organic defects, such as adenoids, enlarged tonsils, ear or eye trouble, or unremediable kidney or heart conditions. (See Section III, Outlines 2 and 3.)

B. Protection from these evils lies in a proper understanding of the health needs of a small child, and unremitting, intelligent supervision. A young child should be watched unceasingly, but the control should be so tactful and the care so unobtrusive and natural that the child is quite unaware of it.

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OUTLINE 6. NUTRITION OF THE OLDER CHILD (6 TO 16 YEARS).

The differences in the diet of the adult and of the older child are differences in degree rather than in kind. Ease of digestion and adequacy in protein, minerals, and vitamines are important for the adult, but they are essential for the child. The results of mistakes in

the diet of children of school age are less quickly seen than in younger children. If school children are properly cared for, their digestive systems grow more sturdy; but chronic carelessness may result in chronic dyspepsia, or even more serious consequences. The adolescent boy and girl require probably as much or more food than an adult man or woman. Restricted or inadequate feeding in this period of extreme growth may have most serious and far-reaching results.

I. ESSENTIAL CHARACTERISTICS OF THE CHILD'S DIET.

(See Section II, Outline 5, Topic II.)

A. Ease of digestion is more important for the child than for the adult.
   1. Simple foods are better than more elaborately made dishes. Children should get their fat as butter, cream, olive oil, or carefully cooked bacon, rather than in richly made dishes or elaborate sauces. After any strong emotion, such as fear, anger, grief, or excessive fatigue, children are even more likely than adults to suffer indigestion after any but the simplest meal.
   2. Fried foods should be given sparingly. Protein or carbohydrate, which has had fat thoroughly cooked into it, can not be digested in the stomach, as no digestion of unemulsified fat takes place there.
   3. Nuts should be used only when thorough mastication can be assured. (Young children should eat them only in the form of paste.)
   4. No risks should be taken "just once" with foods known to be difficult of digestion.

B. The character of the protein is more important for the child than for the adult. (See Section II, Outline 2, Topic IV, A, 2.)
   1. Children need adequate proteins not only for maintenance of tissues and so of body processes, but also for growth.
   2. Protein-rich foods that are liable to bacterial decomposition in the intestines, such as legumes, should be used sparingly and cooked carefully.

C. An adequate supply of minerals and vitamines is also more important. (See Section II, Outline 2, Topic IV, D and E.)
   1. Calcium and phosphorus, required by adults for maintenance of tissue, are specially needed by children for growth of the tissues, particularly of the bones and teeth, as well as of the soft tissues.
   2. Iron is needed to insure adequate hemoglobin to carry to all the cells the oxygen needed for their activities.

D. The quantity of food needed is greater. The amount of food needed by children is greater per unit of weight or surface than the amount needed by adults, because they must provide for growth requirements as well as for maintenance needs. In consequence, children need, as a rule, twice as many calories per pound as do adults. (See Section II, Outline 2, Topic III.)

II. ESSENTIAL FOODS.

(See Section II, Outline 2, Topic IV; Outline 5, Topic II.)

A. Cereal foods. (Other seeds are similar in composition to the grains.)

1. The great bulk of the diet of all peoples consists of cereals (50 per cent in France, and 30 per cent in the United States). This is largely because of their cheapness, the ease with which they are grown and stored, their blandness, and their ease of digestion.
2. Cereals furnish about 43 per cent of the protein in the diet (legumes and most nuts contain more protein than grains). In 92 dietary studies made recently in New York City, cereal products furnished nearly 39 per cent of the total calories, and 36 per cent of the protein, though they cost less than 18 per cent of the food money (10 to 27 per cent). (See Sherman and Gillett.)
3. Considerable amount of the minerals of the diet is furnished also by these foods.
   (*a*) Twenty-nine per cent of the phosphorus.
   (*b*) Fifteen per cent of the calcium.
   (*c*) Twenty-five per cent of the iron.
4. Cereals alone are not a complete food. They must be supplemented as to—
   (*a*) Proteins, which are inadequate, containing too little of some of the amino acids, even for maintenance.
   (*b*) Minerals, among which sodium, calcium, and chlorin are present in inadequate amounts.
   (*c*) Vitamines. (The fat-soluble vitamine is practically absent; and water-soluble "B" is present chiefly in the germ and in the outer layers of the grains, and for all practical purposes is absent in highly milled products.)

B. Milk.

1. Milk is the most valuable food to supplement cereals.
   (*a*) Its proteins are excellent for growth; and contain all the essential amino acids in good

B. Milk—Continued.

1. Milk the most valuable food to supplement cereals—Con.

proportion. The inadequate proteins of legumes are also supplemented perfectly by milk.

(*b*) Its minerals are sufficiently basic to offset the acidity of the ash of cereals. Calcium, sodium, and chlorin are all present in abundance. In almost all dietaries, the calcium content runs parallel to the milk consumption; diets that lack milk are nearly always deficient in calcium.

(*c*) All three of the known vitamines are present, if the milk is fresh and has not been subjected to prolonged high temperatures (the fat-soluble vitamine appears to be found in larger amount in the milk from pasture-fed cows than in that from stall-fed cattle). Children having no whole milk should have butter rather than nut margarine or any vegetable oil margarine. The best oleomargarine may contain considerable fat-soluble vitamine, but it is very variable and not the equal of butter in the child's diet.

2. Nothing can take the place of milk in the diet of a young child, nor of an older one who is growing rapidly. This is partly because of its unique completeness, and partly because it makes up, as does no other food, the deficiencies of the grains which, the world over, make up the bulk of man's diet.

3. At least a pint should be included in the daily diet of the growing child.

(*a*) Obviously, children can grow up without it, but they are far more likely to suffer from dietary deficiencies without it than with it. (In more than one orphanage the addition of merely a quart of milk a day to the diet of each child of a group has wrought almost unbelievable improvement in energy, rate of growth, resistance to disease, general health, and appearance. That this was not due simply to increase in the total fuel value of the food was proved with other groups.)

(*b*) Milk as a source of calcium.

(1) In the New York dietaries (see Topic II, A, 2), 57 per cent of the calcium

B. Milk—Continued.

3. At least a pint should be included in the daily diet, etc.—Continued.

came from milk and cheese. Dietaries which contained less than one-third of a quart of milk for each member of the family were deficient in calcium.

(2) Children need more than the average allowance of calcium, if their bones are to become strong.

(*c*) Milk as a source of complete protein. Experimental animals growing slowly on a diet containing no proteins except those from grains show normal growth when part of the protein is replaced by milk proteins. If milk is the only form of animal protein in the diet a quart a day should be allowed every child.

(*d*) Milk as a source of vitamines. (See Section II, Outline 2, IV, E.)

4. Children who dislike milk will generally take it, if it is flavored with cocoa or cereal coffee, or made into cream soups; still more readily in puddings, custards, and for older children in scalloped dishes.

5. Milk is not an expensive food when its food value is considered. Even at 18 cents a quart one gets from it more protein and more energy than the same amount of money would buy in eggs at 35 cents a dozen; more energy and almost as much protein as in beef at 35 cents a pound.

6. Forms of milk (see Section II, Outline 3, Topic IV). Condensed, evaporated, powdered, or even skimmed milk is far better than no milk at all, although skimmed milk has only one-half the fuel value of whole milk, and lacks not only valuable fat but the vitamine associated with it.

C. Vegetables and fruits. (See Section II, Outline 4, Topic VI, B, 1 and 2.)

1. These foods supply minerals. Calcium, in which cereals are deficient, and iron, in which milk is somewhat deficient, are supplied in most foods of this group. (See Section II, Outline 5, Topic II, B, 4.)

2. Some of them are rich in carbohydrates. Potatoes, grapes, and bananas are about one-fifth carbohydrate, and all dried fruits are rich in sugar.

C. Vegetables and fruits—Continued.

3. Some of them serve special purposes. Green-leaf vegetables are "protective" foods in much the same sense as is milk.
   (*a*) Their protein content is small in amount but complete in containing all essential amino-acids in good proportion, as judged by their ability to support normal growth in animals.
   (*b*) They are rich in iron, which is lacking in milk and in most cereal foods.
   (*c*) The vitamines are all present in abundance.
4. Their ash is preponderately alkaline, neutralizing the acid ash of cereals, legumes, meat, and eggs. Prunes, plums, and cranberries are exceptions, since they contain benzoic acid, which the body can not oxidize to carbonates, as it can do with most organic acids.
5. They stimulate peristalsis by means of the cellulose and organic acids they contain, and so prevent constipation.
6. As a group, these foods give variety in flavor, texture, and color. (They can be served in cream soups to small children, and to larger ones who do not like them undisguised.)

D. Eggs. (See Section II, Outline 4, Topic VI, B, 4.)

1. Eggs are desirable sources of complete proteins, of vitamines and of minerals, especially calcium, phosphorus, and iron in the yolk.
2. Except in iron content they are in no way superior to milk, and when they cost more than 50 cents a dozen, they are more expensive as sources of complete protein than milk at 18 cents a quart.
3. If they are omitted from the diet, care must be taken to supply iron in spinach and other green vegetables, in legumes, in fruits, especially oranges and prunes, and in whole cereals.
4. Eggs are easily digested by almost all children, especially when soft cooked.

E. Meat and fish. (See Section II, Outline 5, Topic II, C.)

Meat is valued chiefly for flavor and as a stimulant to the flow of the digestive fluids.

1. Muscle meat.
   (*a*) In the character of its proteins, its minerals and its vitamines, meat from muscle is decidedly inferior to milk and eggs.

E. Meat and fish—Continued.

1. Muscle meat—Continued.

(*b*) It is insufficient as a supplement to cereal foods, because in minerals it is nearly as deficient as are seeds.

(*c*) Muscle proteins are somewhat superior to those of grains.

2. Liver and other vital organs are far superior to muscle in the character of their protein, minerals, and vitamines. Carnivorous animals eat these and the blood of their victims first, and so are not subject to the dietary deficiencies from which men suffer when they try to live on a diet too largely composed of ordinary meat (muscle).

3. Fish appears to be superior to our ordinary meat in the same respects as are the vital organs of animals. (See Drummond.)

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III. AMOUNT OF FOOD.

(See Section II, Outline 2, Topic III, C.)

A. Factors involved.

1. The amount of food needed by any person depends on—
   (*a*) The amount of active metabolizing tissue, and
   (*b*) The degree of activity of the tissues.
2. The amount of active metabolizing tissue is, for practical purposes, considered as roughly proportional to body weight or to surface area.
   (*a*) For babies, weight appears to be a better unit.
   (*b*) For children and for adults, surface is a better unit, but it is difficult to measure surfaces, and this unit is not widely used. (For formulas and charts, see Du Bois.)
3. The degree of activity in the tissues includes:
   (*a*) The activity of skeletal muscles expressed either as occupation or as activity (light, moderate, vigorous, or severe activity).
   (*b*) Internal activity or basal metabolism, which includes:
      (1) Muscle tone.
      (2) Work of respiration.
      (3) Work of circulation.
      (4) Other internal processes.
   (*c*) Generation of energy connected with alimentation, which includes work of digestion and the specific dynamic effect of food. This involves an increase of from 12 to 15 per cent over basal metabolism.

B. Basal metabolism.

1. The total basal metabolism of normal children has been studied by a number of observers. (Results of such studies are shown in Table XV and Chart 1.)

TABLE XV.—*Basal metabolism per age and per weight.*[1]

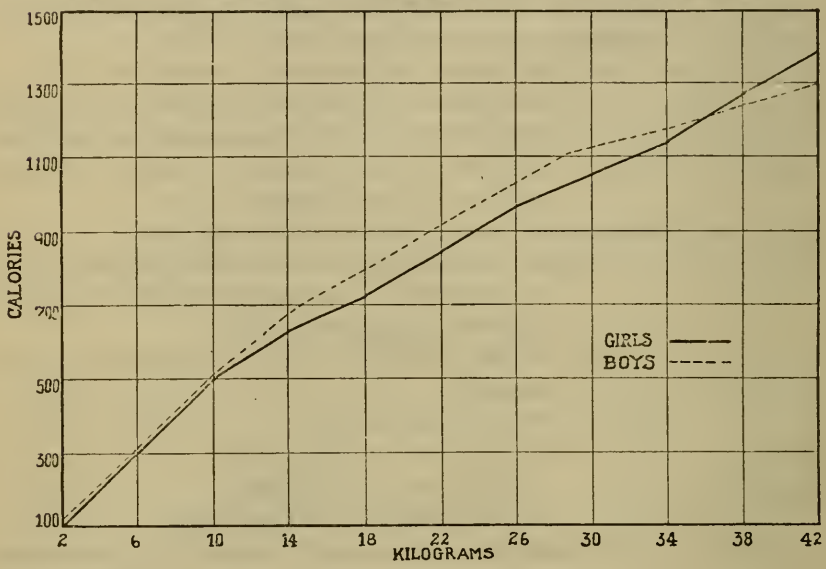
Age in years	Average weight in kilograms.	Total calories.	Calories per kilogram.	Number of experiments summarized.
6				
7	17.0	943	56	3
8	18.4	1,030	56	3
10	21.8	1,046	48	1
11	30.6	1,346	44	1
12	34.5	1,302	38	3
13	31.6	1,261 (1,647)		7
14	32.5	1,339 (1,747)	41	5
15	37.8	1,362	36	4
16		(1,926)	30	
17	51.4	1,541	30	3

[1] From Gillett, p. 16; figures in parentheses from Du Bois.

B. Basal metabolism—Continued.

2. There is apparently a slight sex differentiation in basal metabolism, boys between 1 and 12 years having a somewhat higher metabolism than girls of the same weight. In Chart 1, the values multiplied by 2 give the calories of total metabolism.

CHART 1.—*Total calories of basal metabolism referred to weight.*[1]



C. Total metabolism.

1. Excess over basal metabolism is due to alimentation and to activity of skeletal muscles; that is, to bodily activity plus the metabolism of growth.
2. It may be from 1.5 to 3 times basal metabolism; generally it is about twice as great.
3. It may be approximately determined by:
   (*a*) Dietary studies.
      (1) One survey of a boys' school showed an average intake of 5,000 calories for 350 boys from 14 to 18 years of age (about 3 times the basal requirement). (See Gephart.)
      (2) Other surveys made in orphanages showed an average intake of 1,700 to 1,800 calories. (See Knight, Pratt, and Langworthy; also Smedley and Millner.)

[1] From Talbot, p. 230.

C. Total metabolism—Continued.

3. It may be approximately determined by—Continued.

(*b*) Calorimetric studies. Reports of a study of metabolism of 258 normal infants and children have recently been published. (See Benedict and Talbot.)

4. The amount of food should be ample. There is no doubt that there has been in the past underestimation of the food requirements of children (see Table XVI). (See Section II, Outline 1, Topic VII, D and E.)

TABLE XVI.—*Food requirements for children according to age group.*[1]

Age.	Daily calories (net).	Needs relative to those of average man.
For the child up to 6 years	1,500	0.50
For the child from 6 to 10 years	2,100	.70
For the child from 10 to 14 years	2,500	.83
For the girl from 14 to 16 years	2,500	.83
For the boy from 14 to 16 years	3,000	1.00

[1] Adapted by the Interallied Scientific Food Commission, 1918. (See Lusk.)

(*a*) From 10 to 15 per cent of the total calories should be protein; or about 2 ounces of protein daily is sufficient, even for larger children, if from one-half to three-fourths of it is animal protein, especially milk protein.

TABLE XVII.—*Amount of protein required by children according to age.*

Age.	Weight (pounds).	Calories per pound.	Calories per kilogram.
6 years	45	34–35	70.4–74.8
7 years	50	32–34	74.8–77
8 to 9 years	.....	30–34	66 –77
10 to 12 years	.....	28–32	61.6–74.8

(*b*) At least 30 per cent of the total calories should be fat.

(*c*) Proportion in which the essential foods should be used.

(1) As suggested by the studies of the New York Association for Improving the Condition of the Poor. (See Food for the Family.)

(*a*) One-fourth of the food money should be spent for cereals.

C. Total metabolism—Continued.

4. The amount of food should be ample—Continued.

(*b*) One quart of milk should be used daily for every child, and at least half as much for each adult.

(*c*) No more should be spent for meat than for milk.

(*d*) As much should be spent for vegetables and fruits as for meat. (If the suggestions, worked out for the family as a whole, are followed in the marketing, a little thought in the preparation and serving of the meals will insure proper nourishment for the children.)

(2) As suggested by the Office of Home Economics of the States Relations Service of the Department of Agriculture for a man of average size doing moderately active work. (See Table XVIII.)

TABLE XVIII.—*Amount of food required by a man of average size doing moderately active work, according to type of diet.*

Food.	Rich and comparatively expensive diet.	Plain and comparatively cheap diet.
Cereals	6 ounces up to	16 ounces.
Milk	1 quart down to...	8 ounces (½ pint).
Meat, eggs, cheese	14 ounces down to.	6 ounces.[1]
Fruit and vegetables	2 pounds down to.	1 ounce.
Fats	3 ounces down to..	1½ ounces.
Sweets	3 ounces down to..	1½ ounces.

[1] Two ounces less should be used for each half pint of milk over 8 ounces.

(3) Proportion needed at different ages in childhood.

(*a*) Children between 6 and 12 years of age will generally require from seven-tenths to eight-tenths as much as an average man.

C. Total metabolism—Continued.

4. The amount of food should be ample—Continued.

(*b*) Boys over 12 years of age may require the whole amount, and girls over 12 years about eight-tenths as much as an average man. (See Table XVI.)

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IV. PLANNING THE MEALS.

A. Breakfast.

1. Breakfast should always contain fruit, stale bread or toast with butter or oleomargarine, cereal with milk, and a beverage of milk, milk and cocoa, or milk colored with a little cereal coffee.

2. An egg is desirable for children who are underweight or anemic, and for those who are growing very rapidly. (It is good in any case, but not necessary for healthy children who eat plenty of whole cereal, bread and butter, milk, and fruits.)

A. Breakfast—Continued.

3. The use of cereal should be begun early, in small amounts, if necessary. It should be cooked very thoroughly and served attractively. Cereal with a little sugar is far better for the child than breakfast without cereal. If cooked with a few chopped dates or prunes it becomes a treat for many children (very few children will refuse cereal if the matter is properly managed). A variety of cereal preparations may be used to avoid monotony and to make breakfast more interesting. Cereals made from whole grains should be used at least part of the time because of their mineral content.

B. Noon meal.

1. Dinner may be made up of meat, fish, poultry, or an egg; potato, rice, or macaroni; root or leaf vegetable; milk or flavored milk to drink, especially if milk is not used in the other dishes; bread and butter; dessert, which may be sweet; puddings made of cereal products, milk, and eggs are particularly valuable. (This is the time of day to satisfy the children's fondness for sweets.)
2. Lunch.

The noon meal should always be hot, whether at home or at school. Such a selection should be made as: Cream of vegetable soup, egg or peanut butter sandwiches, fruit and cookies or cup custard.

C. Supper.

1. For the younger ones, the heaviest meal should come at noon, and the night meal should consist of dishes made of milk, eggs, cereals, fruits, and vegetables (poached egg, bread and milk, baked potato, stewed fruit, or baked banana make good supper dishes).
2. For older children there need be little difference between the noon meal and the one at night (meat, however, should be given only once a day.)

D. General arrangement.

1. Food from each of the groups of foods listed in Topic II. (Cereals; milk; vegetables and fruits; and eggs, meat, or fish should be present in the diet every day.)
2. Ease of digestion, character of the protein, adequate supply of minerals and vitamines, and total daily amount of food should be kept in mind. (See Topic I.)
3. Variety in flavor, texture, temperature, and color are at least as important for children as for adults.

(*a*) A meal composed entirely of creamed dishes and soft puddings would be monotonous, no matter what the variety of flavor.

D. General arrangement—Continued.
3. Variety in flavor, etc.—Continued.
(*b*) A salad would relieve monotony. (A child can be taught to enjoy simple fruit or vegetable salads served with oil or boiled dressing.)
4. It is wise to consider the individual taste of children and to disguise what they need and dislike; but this should be done without talking about it, and merely finical scruples should be gradually and patiently eradicated.

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V. THE HOT SCHOOL LUNCH.

1. An inadequate lunch has the same result as an insufficient breakfast: the child tires easily and does not have the strength for the amount of application demanded. The total amount of food taken during 24 hours is almost inevitably reduced.
2. At least one hot dish should be served in the schoolhouse to all children who are not able to go home to lunch (this may well be cream soup or cocoa). Only simple equipment and slight expense are necessary.
3. This is done in an increasingly large number of cities and rural communities.
(*a*) New York City, in 1916, had a penny-a-portion service in 20 schools, registering 3,200 children.
(*b*) One State in the Middle West had last year 79 schools distributed through 6 counties in which a hot dish was served at noon. (The number should be many times as great.)
4. Advantages of the hot school lunch. Food values, food preparation, and food habits can be taught.
(*a*) The children's diet can be improved and variety given to lunches.
(1) Total calories of daily diet is increased.
(2) By adding milk, and milk soups or cocoa, adequacy of diet is increased.
(3) One hot dish often increases appetite, improves digestion, and increases the utilization of the whole lunch.
(4) If only one hot dish is served, the children should carry sandwiches of graham, whole wheat, nut, currant, raisin, or some other

4. Advantages of the hot school lunch—Continued.
   (*a*) The children's diet, etc.—Continued.
   nourishing bread, with filling of egg, cheese, peanut butter, chopped meat or raisins, dates, or jam; fruit, and cookies.
   (*b*) Many schools which can not afford home economics courses can give much of the work in this simple way, if the teacher in charge is sufficiently in earnest and sufficiently aware of the importance of the opportunity.
   (*c*) Teamwork can be taught if the children help in the preparation of the lunches.
   (*d*) Experience shows that much better work is done in the afternoon session after such a lunch than after a cold one; the pupils are more alert and more responsive, they are more interested in their work. Also, they often show a better rate of growth.

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VI. FOOD HABITS.

(See Section II, Outline 5, Topic II, D.)

1. Three regular warm meals should be provided daily.
   (*a*) Regularity is necessary if the child is to have good digestion, proper assimilation, and satisfactory elimination of waste substances.
   (*b*) Most healthy children of normal weight are better off with three meals a day. (Undernourished children usually have to have extra feeding, as they can not take enough food at the regular meals.)
   (*c*) If well children are allowed to eat between meals, the food should be a slice of plain bread or a cracker. Such food will seldom tempt them to eat too much, nor will it remain in the stomach long enough to take away appetite for the next meal.
   (*d*) Warm food is more digestible than cold.

2. Plenty of water should be taken between meals; liquids drunk with meals should not be used to wash the food down.
3. Sufficient time should be taken for meals. Thorough mastication is beneficial.
   (*a*) To keep the teeth in good condition. For this purpose some food in each meal should require chewing.
   (*b*) To divide the food so finely that it will be readily accessible to enzymes.
   (*c*) To mix it thoroughly with saliva to start the digestion of the starch.
   (*d*) To lessen the likelihood of bacterial action on the food with the formation of gas. This is accomplished in chewing by finely dividing the food and thoroughly mixing it with saliva.
   (*e*) To increase the utilization of the food in every way. There is some evidence that healthy active men have as high a percentage of utilization after bolting food as after thorough mastication of it. Practical experience with children does not encourage one to presume on that discovery in teaching them food habits. Manners and self-control are as important from the standpoint of nutrition and general physical efficiency as from the standpoint of general social welfare.
4. Meals should be made pleasant.
   (*a*) Talking about food at the table may not only lessen appetite but also interfere with digestion.
   (*b*) Calm, pleasant, cheerful conversation in which the children have part helps to prevent bolting and to improve digestion.
   (*c*) In many homes now, mealtime is the only regular occasion on which the whole family can be together. If the family is to perform the functions toward the child for which it primarily exists, its members should all make the most of mealtime as social occasions.
   (*d*) Any strong emotion may completely stop the digestive processes and, by allowing bacterial decomposition of the food, cause serious "indigestion."
5. Children (and adults) should persistently try to like all wholesome food.

VII. DANGER OF INADEQUATE DIET DURING THE GROWTH PERIOD.

A. When the food is insufficient, body tissues are burned as fuel.
   1. Investigation has shown that even in starvation the skeleton of an animal may continue to grow, while the body

A. When the food is insufficient, etc.—Continued.

weight remains constant or even decreases. This growth is accomplished at the expense not only of the reserves of fuel, glycogen, and fat but even of muscle tissue.

2. In spite of this degree of growth, more or less stunting nearly always results from inadequate diet. Not only in individuals but in races as well, dwarfed size often runs parallel to unbalanced ration. As knowledge of diet adequate for the growth period increases, we are accumulating examples of children whose growth (receiving no setback from improper food, too little food, or from illness) has been more rapid than that of their parents or other relatives; of other children of thin and gaunt families, who, proper food having increased their resistance, pass through the growth period without being attenuated.

3. It should be remembered, however, that there is a "growth impulse" independent of diet, characteristic of species and perhaps also of races and of families.

B. Loss of muscular and nervous energy, resulting in flabby muscles, and so in fatigue, weakness, and lack of endurance, often occurs.

C. Resistance to infection, particularly to that from tuberculosis, pneumonia, and the common diseases of childhood, may be lowered. (See Section III, Outline 3.)

D. Mental ability may be decreased.

1. Undernourished children are generally dull or restless, in either case lacking the power of concentration. Retardation in school is frequently due to malnutrition.

2. More concise and definite information than has hitherto been available about the results of prolonged malnutrition is afforded by a survey made of the school children of Trier, Germany, early in 1919, after two or three years of underfeeding. General war conditions had, of course, much influence—quite as much as inadequate food—but in many cases the effects of the two could be studied separately.

(*a*) The average quality of work had deteriorated, largely on account of undernourishment, though partly on account of war conditions in general.

D. Mental ability may be decreased, etc.—Continued.

(*b*) The percentage of pupils doing superior work decreased from 20 to 10; that of pupils doing inferior work increased from 20 to 30. Psychological tests showed the change in mental capacity in the children of superior intelligence to be only temporary; by great effort they could do superior work for a short time. But children whose work dropped from average to deficient could not force themselves to the grade of intelligence of average children. The change appeared to be permanent.

(*c*) After three years of malnutrition, those pupils who before the war had kept up with their grades were doing distinctly inferior work.

(*d*) The percentage of retardation had doubled, and at least half the increase was due to malnutrition.

(*e*) A clinical study showed results other than mental. There was an increase of restlessness in some of the children, but 20 per cent were too quiet, immobile, not infrequently falling asleep. A general loss of both muscular and nervous energy was noticeable; quick tiring in the games at recess, loss of power of attention and of memory. There was a general increase in slight speech defects.

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VIII. MALNUTRITION.

A. Occurrence.

1. An examination of the school population in New York City by the medical inspectors of the health department, in 1919, disclosed 19.9 per cent of the children malnourished.
2. Information as to the number of malnourished children was received from 15 cities. (See Table XIX.)

A. Occurrence—Continued.

TABLE XIX.—*Extent of malnutrition in 15 cities of the United States based on number of children examined and number malnourished.*[1]

City.	Children examined.	Children malnourished.
Cincinnati, Ohio	36,438	1,619
Chelsea, Mass	2,766	98
Haverhill, Mass	7,976	152
New York, N. Y	330,179	13,999
Providence, R. I	3,021	359
Rochester, N. Y	18,497	945
San Francisco, Calif	5,576	282
Worcester, Mass	18,342	389
Springfield, Mass	8,938	35
Albany, N. Y	2,861	139
Cleveland, Ohio	61,578	671
Harrisburg, Pa	8,667	199
Louisville, Ky	13,190	59
Newark, N. J	27,971	940
Raleigh, N. C	1,909	133
Total	547,909	[2] 29,019

[1] Information was sought from 41 of the largest American cities, but the reports received from most of them were meager and unsatisfactory. Only 15 of the cities reported the number of children examined and the number found malnourished.
[2] Or 5.3 per cent.

B. Indications.

According to the chief medical officer, board of education (England and Wales), the indications of malnutrition are to be found in—

1. The relation between height and weight.
2. The relation between height, weight, and age.
3. General appearance.
4. Skin and subcutaneous tissue conditions.
5. Muscle tone and development.
6. State of mucous membrane.
7. Vigor or listlessness.
8. Carriage.
9. Movements.
10. Voice.
11. Interest.
12. Attention.
13. Appetite.

C. Causes.

The causes of malnutrition may be subdivided into social and individual. (See Section III, Outline 5.)

1. Social:
   - (*a*) Living in rooms without windows or sunlight.
   - (*b*) Lack of batning facilities.
   - (*c*) Lack of ventilation.

C. Causes—Continued.
1. Social—Continued.
(*d*) Employment out of school hours.
(*e*) Insanitary school conditions.
2. Individual:
(*a*) Food—insufficiency, unsuitability.
(*b*) Injurious sleeping arrangements.
(*c*) Insufficient sleep.
(*d*) Want of cleanliness.
(*e*) Diseases, such as adenoids, bronchitis, tuberculosis, cardiac diseases, rheumatism.

D. Underlying conditions which are also responsible:
1. Economic pressure on the family budget. (See Section III, Outline 6.)
2. Ignorance of home economics on the part of the housewife.
3. Neglect or inability to feed the family properly.
4. Congenital or hereditary diseases or defects in parent or child.

E. Degree of malnutrition can be properly judged only when "norms" are established.
1. The relation of weight to height is receiving increasing consideration as a reliable indication of normal or subnormal condition.
(*a*) Of this relation, no "norms" are generally accepted.
(*b*) The following tables, giving height and weight relations, should be studied:
(1) That prepared by Dr. Thomas D. Wood, of Columbia University, and published by The Child Health Organization, 156 Fifth Avenue, New York, for children over 5 years of age.
(2) The tables used by Dr. W. R. P. Emerson, nutrition clinic for delicate children, Boston, for children over 5 years of age, from a combined table of Boas's and Burke's figures. (See Baldwin.)
(3) The Children's Bureau tables of heights and weights for children from birth to 6 years of age.
(4) Bowditch's tables of heights and weights for children from 5 to 16 years of age.

E. Degree of malnutrition, etc.—Continued.

1. The relation of weight to height, etc.—Continued.

(5) The tables prepared by Baldwin based on data from all available authorities, comprising approximately 5,385,400 recorded cases in various countries.

(*c*) The superiority of this relation to age relations (height-age or weight-age) has been convincingly shown. Graphs showing this relationship in American, Japanese, Russian, Polish, and Italian boys are closely parallel, almost identical in character. (See Holt.)

(*d*) A child is considered to be undernourished who is habitually either 7 per cent underweight for his height (see Emerson, Food Habits, etc.); or 10 per cent. (See Holt.)

2. The yearly rate of increase in weight and height is another standard that is being much advocated. (See Holt.)

IX. TREATMENT OF UNDERNOURISHED CHILDREN.

A. Examination.

1. Accurate weighing and measuring of all school children.
2. Thorough medical examination and correction of any defects that are contributory causes of subnormal condition.

B. Food.

1. Plenty of it should be provided.
2. The character of the diet must be improved. The substitution of cereal and milk for coffee and hot cakes or fried potatoes will often make an appreciable change in growth rate. The simple addition of a quart of milk a day to a very inadequate diet has changed a flat growth chart to a normally rising one in many cases.
3. A simple mid-morning lunch of cracker and milk, porridge and milk, or some similar food should be served at school to supplement the inadequate home diet.
4. Children who carry their lunch to school should have at least one hot dish provided at the school.

C. Rest.

A short period of enforced rest during the mid-morning or mid-afternoon is necessary to obtain the desired improvement.

D. Education.

1. Nutrition classes are being held in some cities after school hours for children under weight.
   (*a*) Weight charts are kept and the children taught to watch them and correlate chart and diet.
   (*b*) Pictures, rhymes and stories are used to drive home important truths about diet.
   (*c*) The children come voluntarily, become much interested, and bring friends who look to them undernourished.
2. Mothers are instructed in their own homes; beginning with the foods they use, they are helped to prepare those foods in other and better ways, told what else the children should have, and made interested in the weight charts.

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OUTLINE 7. PUBERTY AND ADOLESCENCE.

The transition period between childhood and manhood demands the best physical care and feeding, because of the enormous growth and development incident to these years. The proper supervision and safeguarding of the adolescent child necessitates an understanding of the physical changes of this period, as well as the nature of sex and the principles of sex hygiene.

In primitive peoples mental and physical maturity coincide far more closely than under civilized conditions. Civilization, in prolonging the period of adolescence, has thus thrown on youth the necessity of reconciling normal sex desires awakened by the physiologic maturity of the sex glands to the demands of its own idealism and society's dictates of chastity. The majority of modern problems of puberty rise therefore from the disparity between the age of sex maturity and that of mental maturity.

I. THE PERIOD FROM 12 TO 16 YEARS.

(See Section II, Outline 1, Topic VII, E.)

A. Significance of this period.

The period is characterized by new emotions and desires, before experience or judgment, which will make for their control and understanding, has yet developed.

1. Significance to the individual.

   This is the most disquieting time of all life. The manner in which the boy or girl makes the necessary adjustments will affect the integrity of the personality throughout life.

2. Significance to the family.

   The marked antagonism to family control, if not understood and met with tact and patience on the part of the parents, frequently permanently alienates the child's affections and threatens the family group.

3. Significance to society.

   Difficulties in adjustment of newly awakened ego-consciousness result frequently in antisocial conduct and lead to a marked increase in juvenile delinquency.

B. Changes at puberty. (See Section II, Outline 1, Topic IV, B, 2.)
1. Physical. (See Section II, Outline 1, Topic VII, E.)
(*a*) Height.
(1) There is a rapid increase in height.
(2) The average increase in height is about 2 inches a year, from 5 to 11 years of age in girls, and from 5 to 13 years of age in boys.
(3) At the eleventh year in girls and at the thirteenth year in boys, the more rapid growth of puberty usually begins. (See Holt and Howland, pp. 20–21.)
(*b*) Weight.
(1) There is a marked increase in weight. The annual rate of gain in weight frequently doubles in a single year.
(2) Up to the age of 10 years the annual gain in weight is about the same for the two sexes. Boys are usually slightly heavier than girls.
(3) From 11 to 13 years of age girls gain more rapidly than boys and exceed them in weight. The greatest gain in girls is in the thirteenth year.
(4) During the fourteenth year boys gain more rapidly, and soon exceed the weight of girls. The sixteenth year is the year of greatest increase in weight in boys.
(5) During the period of greatest growth, boys should gain an average of 16 ounces a month; girls an average of 12 ounces. (See Wood.)
(*c*) Other body changes.
(1) Increase in body fat is less marked in boys than in girls, but there is greater bone and muscular development in boys. Groups of muscles develop unevenly, however, which causes a tendency to the development of bad posture habits.
(2) Nerve control of muscles often does not keep pace with muscle growth, caus-

B. Changes at puberty—Continued.
1. Physical—Continued.
(*c*) Other body changes.
ing marked awkwardness of both boys and girls.
(*d*) Reproductive organs.
(1) Hair appears on the body, especially about the genitals. (The term "puberty" means "period of bodily hair.")
(2) Reproductive organs increase in size, and function is established. (See Topics I, E, and F.)
(3) Development of secondary sex characters; in girls, growth of breasts; spreading of hips; changes in figure generally; in boys, deepening of voice; hair on the face.
2. Psychical. (See Section IV, Outline 5.)

C. Onset of puberty and duration of transition period is influenced by:
1. Climate.
In warm countries, pubescence appears earlier than in cold.
2. Heredity.
Certain families show a tendency to "mature" at a much earlier age than others. Families likewise show great variations in ability to make rapid adjustments, tendencies to digestional and circulatory disturbances, etc.
3. Food and living conditions.
Well-nourished and well-developed children living under wholesome conditions tend to an earlier pubescence and show less disturbances than do less fortunate children.
4. Sex.
Generally speaking girls "mature" about two years earlier than do boys, and their period of transition is usually more prolonged.

D. Signs of puberty.
1. More obvious signs of puberty are recognizable in the appearance of physical changes. (See Topic I, B, 1.)
2. Changes of internal organism as in blood pressure, number of red blood cells, etc., usually detectable by ex-

D. Signs of puberty—Continued.

2. Changes of internal organism, etc.—Continued.

pert methods about two years before the appearance of outward manifestations, menstruation, or emissions. Hence we may expect psychological manifestations earlier than the so-called "maturity" would lead us to anticipate.

E. Menstruation. (See Section I, Outline 2, Topic I, C, F, and H.)

1. Ovulation.

(*a*) The periodic discharge of blood, together with the mucous membrane lining of the uterine cavity, is usually synchronous with or follows ovulation (the maturing and escape of the egg cell).

2. Changes in the uterus.

(*a*) The lining of the uterus changes constantly during the monthly cycle; it thickens in order to receive the fertilized egg-cell.

(*b*) When the ovum is not fertilized, this lining is thrown off.

(*c*) The uterus is heavier immediately preceding and during menstruation, due to congestion of blood vessels (this accounts for some discomfort, which may be experienced).

3. Irregularity.

(*a*) The menstrual cycle is usually not established with regularity at once. During the first year several months may normally elapse between periods.

(*b*) After the cycle is established, the omission of one menstrual period is not likely to be a matter for anxiety. Omission of several periods, however, indicates disturbance in general health, which should be brought to the attention of a physician.

(*c*) Menstruation which occurs at intervals oftener than approximately four weeks is usually a sign of lack of muscle tone and physical well-being. It may be due to fatigue, heart lesion, anemia, etc. If the establishment of hygienic living does not correct this condition, a physician should be consulted.

4. Painful menstruation (dysmenorrhea).

(*a*) This is rarely due to organic defect.

E. Menstruation—Continued.

4. Painful menstruation—Continued.

(*b*) Often a psychical element is involved, such as fear, shock, etc. Highly sensitive girls are more likely to suffer than others.

(*c*) Vaginal examinations are rarely indicated.

5. Excessive menstruation.

(*a*) Excessive flow is usually due to lack of muscle tone (particularly of abdominal muscles), but may be caused by anemia or heart lesion. When persisted in a physician should be consulted.

6. Late menstruation.

(*a*) The delayed appearance of menstruation to the sixteenth or seventeenth year may be due, in order of frequency, to:

(1) Malnutrition.
(2) Lack of general development.
(3) Anemia.
(4) Disturbance of internal secretions (endocrinal glands).
(5) Incipient tuberculosis.
(6) Other chronic disease.

F. Sex maturity in boys.

1. Emissions.

(*a*) With the actual secretion of spermatozoa and the accumulation of seminal fluid occur the so-called "seminal emissions" or "wet dreams."

(*b*) These vary greatly in the frequency of their occurrence. They may occur as often as two or three times a week or as seldom as once in two or three months and still remain within the limits of normality.

(*c*) Boys should be advised of these facts by their parents to avoid possible association with fear or shame, and the danger of being sent by some irresponsible person to a quack doctor.

2. Erections.

(*a*) Erections of the penis occur with increased frequency with the establishment of puberty.

(*b*) Their frequency is influenced markedly by the boy's own mental attitude, habits of mind and body, reaction toward girls, etc.

G. Hygiene of puberty. (See Section III, Outline 1, Topic IV.)

1. Physical care.

(*a*) Food.

(1) Capricious appetites make the establishment of a proper dietary often very difficult, while the intensive metabolic changes taking place within the organism demand that at this, of all times, the boy and girl should receive plenty of wholesome food at regular intervals. (See Section II, Outline 6.)

(2) Craving on the part of girls for such articles as dill pickles, all manner of sweets, etc., must be combated in so far as is possible by proper food habits.

(3) All stimulants, including coffee, tea, tobacco, etc., should be avoided.

(*b*) Athletic sports.

(1) Organized athletic play for both sexes is of incalculable value at this age.

(2) Every effort should be made to interest the clumsy, overgrown boy in sports.

(3) Girls at this age are inclined to be physically lazy, and this tendency should be offset by their organization into athletic teams, "hiking" clubs, etc.

(*c*) Sleep.

(1) Children at this age need a great deal of sleep, usually at least 9 hours at night.

(2) Sleeping in cold rooms without any more than the essential covering, the habit of enduring physical hardships, and in general the process of physical hardening should be encouraged, especially among boys.

(*d*) Care during menstruation.

(1) Exercise.

(*a*) All normal exercises should be encouraged. The more violent forms, such as basket

G. Hygiene of puberty—Continued.
1. Physical care—Continued.
(*d*) Care during menstruation—Continued.
(1) Exercise—Continued.
ball, horseback riding, and swimming should be avoided in most instances.
(*b*) In almost all cases the girl is far better off if she is taught to carry on her usual activities at this time than if she is encouraged to lie about with a hot-water bag.
(2) Bathing.
(*a*) A lukewarm bath should be taken every day when possible during the period.
(*b*) When this can not be done the girl should be taught the need of cleansing the genitals daily with warm water and soap.
(3) Constipation.
(*a*) Constipation is one of the frequent accompaniments of the menstrual period.
(*b*) Care should be taken for its avoidance by means of a vegetable and fruit diet and a generous supply of drinking water rather than by cathartics.
(*c*) Chronic constipation is often the cause indirectly of much menstrual pain.
(4) Attitude of mind.
(*a*) A wholesome attitude of mind toward all matters relating to sex has a marked influence on the degree of pain suffered, the regularity of the flow, etc.
2. Psychical care. (See Section IV, Outline 6, Topic II.)

II. Disorders of puberty.

1. Physical.

(*a*) Digestion.

(1) Digestive disturbances are very frequent at this age and are often accompanied by pain. (Appendicitis is common.)

(*b*) Circulation.

(1) With boys and girls who have grown very rapidly and who are undernourished, one should be on guard against heartstrain. This danger should also be borne in mind in the training for athletics. Organic heart lesions often come to light now for the first time, although they may have existed since early childhood.

(2) Such circulatory disturbances as cold hands and feet, accompanied with the excessive sweating of nervous origin, can best be met by improved hygienic living.

(*c*) Posture.

(1) Bad posture habits due in part to unequal muscular development should be guarded against by setting-up exercises and careful attention to manner of standing, sitting, etc.

(2) Such habits developed at this age frequently result in slight curvatures of the spine, undeveloped chests, relaxed abdomens, etc., which remain uncorrected throughout life.

(*d*) Sex habits.

(1) Masturbation is exceedingly common at this age. It is much more frequent among girls than is commonly believed. (See Holt and Howland, pp. 715–718.)

(2) In the great majority of cases, it does no permanent injury.

(3) Its seriousness lies largely in the fact that it keeps the boy or girl overstimulated sexually, involves a great waste of nervous energy, creates a

II. Disorders of puberty—Continued.
1. Physical—Continued.
(*d*) Sex habits—Continued.
sense of distrust of self, and among girls especially, a feeling of unique degradation, which attacks the very foundation of their personality.
(4) Its cure depends on the will power, etc., of the individual, which can be best motivated through the supplying of the individual with every possible channel for the wholesome outlet of his physical and nervous energy.
(5) Sentimental love stories, daydreaming, morbid self-analysis, etc., are frequently associated and should be discouraged, not by commands or wordy appeals, but by substitution of more stirring vital interests.
(*e*) Bad heredity.
(1) Any inherited weaknesses of the mind or body, which may have been latent up to this period, may now be expected to manifest themselves. This is true of epilepsy, inherited syphilis, and other less serious conditions. (See Section IV, Outline 7, Topic III.)
2. Psychical. (See Section IV, Outline 5, Topic III.)
(*a*) Girls.
(1) Daydreaming.
(*a*) A normal condition, but one which should be discouraged.
(*b*) Daydreams usually have a sex basis and tend to lead to various forms of self-indulgence and to an intense dislike of the more prosaic problems of reality, which the girl must learn to solve.
(2) Sentimental friendships ("crushes").
(*a*) Intensely romantic attachments to older persons and to other girls are common occurrences.

II. Disorders of puberty—Continued.
2. Psychical—Continued.
(*a*) Girls—Continued.
(2) Sentimental friendships—Continued.
(*b*) Frequently these are a form of hero worship and may be, if properly directed, a power of real educational value, especially when they occur between the teacher and pupil.
(*c*) When they involve such traits as jealousy, a desire on the part of one personality to dominate completely and exclude all others, the total result is bad and may lead to forms of homosexuality.
(3) The "boy craze."
(*a*) The intense interest in boys, clothes, parties, etc., normally found must be offset by wholesome recreation.
(*b*) Dramatics provide a valuable means of "dressing up" and "showing off" in a legitimate fashion, and therefore furnish a valuable outlet to this impulse.
(*b*) Boys.
(1) Mental restiveness.
(*a*) The antagonism between the almost fully grown body and the still childish mind so common to boys of this age develops an inner conflict which shows itself in intense restiveness, resistance to authority, etc.
(2) Diminished power of concentration.
(*a*) The rapid changes taking place within the organism being unaccompanied by corresponding growth in the brain, the boy has periods of being quite unable to concentrate on any form of mental work.

H. Disorders of puberty—Continued.
2. Psychical—Continued.
(*b*) Boys—Continued.
(3) Sex impulses.
(*a*) Intensive friendships are somewhat less common at this period than in the case of girls. Devotion for another is apt to be for a person of the same sex. The average boy under 16 years of age avoids girls.
(*b*) In spite of every wish to the contrary, boys at this stage are frequently tormented by sex impulses difficult to control at times.
(*c*) Denied expression, these impulses manifest themselves in an interest in obscene stories, a boasting of amatory adventures, collecting suggestive pictures, etc.
(*d*) Athletic sports and contests are the best antidote for this condition.
3. Prevention. (See Section IV, Outline 6, Topic II.)
(*a*) Medical supervision.
(1) Every boy or girl showing any variation from the normal should be carefully examined by a physician.
(2) Competitive games and ultrastrenuous athletics should not be permitted without careful supervision to prevent dangers of heart strain, "overtraining," etc.
(*b*) Self expression.
(1) Every possible channel of wholesome interest, physical and mental, should be encouraged as an outlet for sex energy, general restiveness, and mental gropings.
(*c*) Training of the muscles.
(1) In school, emphasis on manual work for boys and girls in the early teens

H. Disorders of puberty—Continued.
3. Prevention—Continued.
(*c*) Training of the muscles—Continued.
should be substituted in large measure for intellectual occupations.
(*d*) Companionship.
(1) The tendency toward "gang" formation and intensive friendships is best combated by the establishment of such organized groups as Boy and Girl Scouts, campfire organization, etc.
(*e*) Sex instruction.
(1) Actual information concerning the laws of reproduction should have been received prior to this time. (See Topic III, A.)
(2) If this has not been done, it is of first importance that it be undertaken at this stage.

II. THE PERIOD FROM 16 YEARS ON.

A. Physical and mental growth.
1. After the transition period of the early teens is safely passed, development proceeds on much more stable lines.
B. Social viewpoint.
1. The interest is now centered less on the ego and more on society.
C. Beauty sense.
1. There is a rapid growth in the love of beauty manifested by a growing appreciation of nature and art in all its expressions.
2. Every effort should be made to give the youth of both sexes as wide an opportunity as can be afforded, not only to become familiar with the creative arts of the masters, but also to find means for his own self-expression.
3. The boy should be encouraged to develop "hobbies," such as mechanical inventions, the writing of poetry and prose, the playing of a musical instrument, painting, modeling, etc., according to his tastes and talents. His efforts should be treated with respect, not ridicule.

D. Social relations.

1. The dangers of later adolescence are chiefly the outgrowth of the relation between the sexes in their recreation.
2. Every possible opportunity for their being together in supervised groups should be encouraged. (See Section IV, Outline 6, Topic II, D.)
   - (*a*) Dancing.
     - (1) Public dance halls should be invariably supervised.
     - (2) The rules of dancing published by the American National Association of Masters of Dancing should be enforced at all private as well as public dances.
   - (*b*) The automobile.
     - (1) The modern tendency of permitting the boy and girl to go off alone on long automobile trips should be combated.
     - (2) "Joy riding" is one of the most serious factors in the problem of sex delinquency among girls.
   - (*c*) The rural problem.
     - (1) Much of the sordid sex vulgarity of rural districts is due to an entire lack of recreational facilities.
     - (2) Opportunity for wholesome fun is perhaps the greatest single need of the young people in country districts today. (See Section III, Outline 5, Topic III, I.)
   - (*d*) Community play.
     - (1) All of the forms of community recreation are of the greatest value in the establishment of healthful social relations among adolescents. (See Section V, Outline 4, Topic II, E.)

III. SEX INSTRUCTION.

A. Preadolescence. (See Section II, Outline 5, Topic III, E, 5; also Section IV, Outline 3, Topic II, I.)

1. At home.

   The first six years in an individual's life are highly significant in their effect upon his future sex psychology.

A. Preadolescence—Continued.

1. At home—Continued.

(*a*) Nervous stability is a constant factor in sex morality. Hence mothers should be taught the importance of the early establishment of a well-organized nervous system through the adoption of the recognized rules of infant welfare.

(*b*) They should be taught also the need of keeping the genitals of the infant clean and to consult a physician concerning circumcision, should an abnormally tight foreskin indicate this measure.

(*c*) The first questions concerning the origin of new life must be truthfully answered by the parents. Thereafter every question must be met honestly at the time of its asking, and the child must feel complete confidence that his inquiries will receive respectful and sincere attention.

(*d*) Mother clubs should make it part of their program to inform themselves of the best methods for teaching their children through the studies of books and pamphlets now available. (See Bascom and Mendenhall, p. 17.)

2. At school.

(*a*) In most instances the teacher will not be permitted to give any class sex instruction to young children.

(*b*) If such instruction is permitted, it should be given only by teachers with a thorough understanding, not only of nature work, but of the normal sex manifestations and the sex psychology of early childhood.

B. Pubescence.

1. Individual instruction.

(*a*) By the time a boy or girl reaches the age of 12 he should be thoroughly conversant with all the biological facts associated with reproduction.

(*b*) This knowledge he should have acquired in an impersonal fashion and in such form as tends to relate reproduction to all living phenomena.

(*c*) Since few children are given this early instruction, it is doubly important that it be offered

B. Pubescence—Continued.

1. Individual instruction—Continued.

now, when sex desires are on the verge of awakening.

(*d*) Usually it will be found that not only must knowledge be imparted, but there are many misconceptions and vulgar misinterpretations gathered from unclean sources which must be corrected.

(*e*) This requires a first-hand knowledge of each individual child on the part of a responsible older person.

(*f*) Therefore, often the most valuable form of sex instruction given at this age is that which is given individually or informally by the teacher, physical director, or the scout leader when an occasion arises where the subject may be introduced naturally.

(*g*) If the boy or girl can be made to talk and ask questions he will often find great relief to his own mental confusion and anxieties.

(*h*) It is highly important that the habit of good manners be established and that both sexes understand thoroughly the reasons thereof.

2. Class instruction.

(*a*) Small, segregated classes may deal with the subject of the physiology of the sex organs as a part of a course in general hygiene, when such a course is in the hands of sincere scientific teachers. Every effort should be made to avoid the least trace of sentimentality or of evasion.

(*b*) Classes in domestic science, mother craft, etc., offer an excellent opportunity for sex instruction to girls.

C. Adolescence.

1. Venereal diseases.

(*a*) Every boy or girl leaving school for work at whatever age should receive full information concerning the modes of infection, prevention, necessity of treatment, etc., of venereal diseases.

(*b*) The social and health significance of prostitution should be presented to the adolescent mind without exaggeration and without morbid stress.

C. Adolescence—Continued.

2. Heredity.

(*a*) The knowledge of the laws underlying the problem of heredity should be brought to the high school youth as one means of developing a sense of racial responsibility. (See Section 1, Outline 2, Topic II.)

3. The family.

(*a*) The study of the human family, its significance in racial integrity, the reasons for monogamy, etc., is of value as a foundation on which to build a respect for marriage. (See Introduction, Topic II.)

4. Literature.

(*a*) Courses in English literature offer perhaps the opportunity available to high-school teachers for the establishment in youth of that sane idealism toward love and sex relations, in which lies the greatest hope for a healthier, happier race.

IV. SEX DELINQUENCY AND PUBERTY.

(See Section IV, Outline 7.)

1. Physical hyperdevelopment.

Precocious maturity accompanied by an unusual degree of physical development should be recognized as constituting a serious problem among sex delinquents.

(*a*) Girls.

(1) An exaggerated sex impulse is frequently manifested in girls of this type.

(2) Too often, in spite of the fact that they have neither the judgment nor the experience safely to divert their energies, they are treated as women rather than as the children they mentally are.

(3) Such girls (usually more unmoral than immoral), when coming from homes which fail to recognize their need, often not only endanger their own happiness but may be a menace to those young boys of the community who are meeting their first sex difficulties.

(4) Their influence in the schoolroom may be pernicious, when they acquire leadership over the younger girls.

(5) Their greatest safety lies in daily physical exercise to the point of fatigue.

1. Physical hyperdevelopment—Continued.
   (*b*) Boys.
      (1) The same is true, but to a less degree, of boys.
      (2) Delinquency due to hyperdevelopment does not so invariably show itself in sex forms.
      (3) This may be due, however, to the fact that boys are not taken into custody for the same sex offenses which bring girls into court.
2. Mental subnormality.
   Close affiliation between sex delinquency and subnormality exists at all stages of the individual's development.
   (*a*) Masturbation is common among this type of children.
   (*b*) Every child who shows the signs of sex delinquency should be given a mental examination as well as physical.

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PROBLEMS RELATED TO SAFEGUARDING THE HEALTH OF THE CHILD

SECTION III.—PROBLEMS RELATED TO SAFEGUARDING THE HEALTH OF THE CHILD.

OUTLINE 1. EDUCATIONAL HYGIENE.

The purpose of educational hygiene, as it affects the children of our Nation, is to establish and maintain through educational methods high standards of health. Such a purpose necessitates the combating of preventable sickness, disability, and death. Since the schools of our country offer the most effective means of accomplishing this end, it is chiefly through them that the movement has grown. That the present system is faulty and largely undeveloped must be acknowledged. In most places the need for its fuller development is clearly seen by the health and educational expert, but not by the general public, to a sufficient degree at least to make the necessary program effective. The amount of preventable disability and sickness in the United States has repeatedly been found in investigations carried out by public and private agencies to be inexcusably large; the cost, both to the individual and to the State, is great. The building up of a satisfactory system of school hygiene to safeguard the health of our children involves first, the framing of a comprehensive and varied program, and second, efficient cooperation between the administration and the community.

I. HISTORY AND PRESENT STATUS IN THE UNITED STATES.

A. In the past school hygiene has developed through three stages:
   1. Detecting and combating of contagious diseases.
   2. Examination and treatment of noncontagious defects.
   3. Maintenance of high health standards.

B. At present these stages are often found coexistent in different parts of our Nation. In most localities the practical status of school hygiene depends on some genuine effort on the part of those interested, expressed through varied propaganda and convincing demonstrations.

C. The science of educational hygiene has evolved into a rather highly organized one. Its procedures are directed along the following lines:
   1. Administration.
   2. Location, plans, and care of building.
   3. Hygiene of the child and teacher.
   4. Health supervision of schools.

D. Some important public agencies interested in the movement are:
   1. United States Bureau of Education, Department of Interior.
   2. United States Children's Bureau, Department of Labor.
   3. Federal Board for Vocational Education.
   4. United States Public Health Service, Department of Treasury.
   5. States Relations Service, Department of Agriculture.
   6. State and city departments of health and education.

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II. ADMINISTRATION.

The essentials for the most thorough and efficient administration of educational hygiene are:

A. Support of public opinion.
B. Legislation. (See minimum standards for child welfare.)
C. Sufficient funds. (See Hoag and Terman, pp. 45–47.)
D. Social unit not smaller than a county or large city is preferable. (Good work on a smaller scale may be initiated by towns and small municipalities, private organizations, individual schools, etc.)
E. Full-time work.
F. Personnel (all connected with the work should exemplify high health standards in their own persons). Complete staff for large school unit should include:
   1. Director: Physician with experience along educational lines and sufficient knowledge of building construction to pass judgment on technical questions.
   2. Physical training teachers.
   3. Playground directors.
   4. Vocational director.
   5. Doctors.
      (*a*) For inspection: Chief medical inspector, assistant medical inspectors, and specialists (eye, ear, nose, throat, orthopedic, etc.).
      (*b*) For mental supervision: Available psychiatrists and psychologists.

F. Personnel—Continued.

5. Doctors—Continued.

(*c*) For treatment if a private physician is unavailable: Especially in minor surgery, orthopedics, pediatrics, eye, ear, nose, throat, and skin diseases. (If desired, the services of doctors from efficient dispensaries can be used instead of incorporating doctors on the staff for treatment.)

(*d*) Sanitary inspector for buildings and grounds.

6. Dentists and dental assistants.

7. Nurses (registered, with public health training when possible).

8. Social-service workers. (These may be connected with local organizations, hospitals, or clinics instead of being employed on the regular staff.)

9. Instructors.

The success of the educational hygiene movement depends on the intelligent cooperation of—

(*a*) Teachers.

(*b*) Health instructors. (See School and Society, 1918, vol. 8, p. 140.)

10. Dietitian where school feeding and malnutrition classes are instituted. (See Section II, Outline 6, Topic IX; Section III, Outline 1, Topic IV, A and B.)

11. Special lecturers.

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III. THE BUILDING.

A. Location chosen with regard to—

1. Drainage, which is facilitated by—

(*a*) Gravel, or sandy soil rather than clay.

(*b*) High ground rather than low, though attention must be paid to protection from wind.

A. Location chosen with regard to—Continued.

2. Convenience, which is estimated by—
   (*a*) Lay of land. (The building should not be on a hilltop, or ground with much slope.)
   (*b*) Distribution of population. (No child should walk more than 1½ miles to school; horse or automobile busses, trolleys, or trains should be available where county system of centralization is present.)
   (*c*) Condition of roads.
3. Water supply. (This should be ample and pure.)
4. Amount of land available.
   (*a*) Playground requirements.
      (1) 50 square feet per child as a minimum.
      (2) 200 square feet per child for running games.
   (*b*) Garden requirements as desired.
5. Street traffic. (It is always dangerous for children.)
6. Noise from traffic, railroads, and factories. (Where schools are badly placed in these respects an attempt should be made to remedy conditions by establishing zones of quiet.)
7. Nuisances. (Dust, smoke, smells, billboards, and slaughterhouses must be socially controlled and must never be neglected.)

B. Plans.

Great progress has been made during the last few years. Widely different requirements of climate, locality, and type of community are being confronted. Essentially, plans should be drawn by a school architect, and the highest standards should be required in regard to building material and construction. There should likewise be sanitary requirements in regard to—

1. Sufficient space to avoid overcrowding.
   (*a*) I, L, T, H, and U shapes preferable to solid squares, as they allow for extensions.
   (*b*) Cottage systems with more or less varied arrangements for classrooms and special needs are recommended by some. (See Todd, "Constructive school hygiene.")
   (*c*) An individual room (not larger than 32 by 24 feet) to a maximum of 40 pupils. (In a room larger than this, hearing and seeing are difficult for those at the back of the room.)

B. Plans—Continued.

1. Sufficient space to avoid overcrowding—Continued.

(*d*) Special rooms for personal use of teachers, physical examinations, libraries, laboratories, workshops, gymnasiums, assembly rooms, and open-air rooms for anemic children, those exposed to tuberculosis, or returned from sanitariums.

2. Lighting orientation (east and west light is best).

3. Fire safeguarding.

(*a*) In new buildings a high degree of protection may be attained through the use of proper construction materials and through plans which provide for the rapid exit of the entire school.

(*b*) In old buildings the following expediencies for improving conditions should be employed:

(1) Two fireproof, incased stairways at opposite ends of the building make the best fire escapes.

(2) Metal partitions, or steel lathing, should surround any place where a fire is located (they are usually put in between basement and first floor).

(3) To minimize the danger from inflammable materials wraps should be kept in cloakrooms, not in corridors: trash in metal containers; storage places should contain no inflammable material; automatic sprinklers should be provided where absolutely necessary.

(4) Gas for illumination purposes should be eliminated where possible.

(5) Fire extinguishers should be placed in classrooms and corridors.

(6) Stairs and corridors should be free from obstruction.

(7) Doors from assembly halls should open outward, with devices for self-release on pressure. Doors from classrooms may open in or out, but if opening on to the corridor, they must be recessed.

B. Plans—Continued.

3. Fire safeguarding—Continued.

(8) Staircases should be at least 5 feet wide and broken by landings (no triangular steps should be allowed). Handrails should be on both sides of stairs, with a center rail when stairs are wide enough for four abreast. A rail guard should be used to prevent sliding. Steps should be about 12 inches broad and 6 inches high.

(9) First and second grade children should not be above first floor. First-floor rooms should open directly outdoors.

4. Sewage disposal. (See Ayres, William, and Wood, pp. 117–124.)

5. Heating and ventilating. (See Wheeler.)

(*a*) Modern steam radiators with modulating valves, located under windows, recommended. Where heating is by hot air no direct current should be allowed on child. All stoves should be jacketed. Temperature should be 68° F., or slightly lower.

(*b*) Ventilating should be by natural, upward method. The following has been recommended as an effective and inexpensive system:

(1) A vent.

The outlet should be on the opposite side of room from radiator, near the ceiling and connecting with a vertical flue leading to the open air.

(2) Intake from unilateral windows.

A board or glass from 10 to 12 inches high resting on window sill and slanting inward and upward may be used for protection. Cloth screens (unbleached muslin) have been used with success.

6. Lighting.

(*a*) Diffused daylight is best.

(*b*) Light should be unilateral, from the left, or carefully controlled overhead.

(*c*) From one-fourth to one-fifth as much window space as floor space is the minimum requirement.

B. Plans—Continued.

6. Lighting—Continued.

(*d*) There should be no outside obstruction, such as tall trees, or walls (no object should be nearer than twice the distance of its height).

(*e*) Window shades should be of white translucent material, as often when sun shines on windows it is necessary to have shades lowered full length; insufficient light is admitted if shades are not translucent. If further shading is necessary another darker shade should be added.

(*f*) Artificial light should be overhead. Indirect electric lighting is best.

(*g*) Walls should be tinted or painted light shades of buff, gray, or green; blackboards should have a dull surface.

(*h*) Glare, annoying shadows, and bright reflections should be avoided.

7. Cleanliness.

(*a*) Walls should be of nonporous, washable plaster.

(*b*) Wood trimmings and all fixtures should have as few projections for dust to lodge on as possible.

(*c*) As little built-in furniture should be used as possible.

(*d*) Floors should be of hardwood (no cracks), or cement covered with linoleum (cement alone is dusty and cold). Tiling may be used in certain places.

8. Special arrangements and fixtures for rooms.

(*a*) Lavatories.

(1) These should be specially well lighted and well ventilated.

(2) There should be separate ones for girls and boys.

(3) There should be one washstand to every 20 persons; one toilet to every 15 persons. (For boys, half the required number should be urinals.)

(4) Where no water supply is available, the best possible dry closets should be used.

B. Plans—Continued.

8. Special arrangements and fixtures for rooms—Continued.

(*a*) Lavatories—Continued.

(5) Liquid soap, paper towels, or individual linen towels, frequently renewed, should be provided.

(*b*) Cloakrooms.

(1) These should be well lighted, ventilated, and heated (for drying damp clothes).

(2) Stands or racks should be of metal, and all hooks should be far enough apart so that the clothes do not touch (18 inches).

C. Inspection.

1. Regular inspection should be made by medical director or sanitarian.
2. Legislative provision should be made for enforcement of important hygienic regulations.

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IV. HYGIENE OF THE CHILD.

(See Section II, Outline 5, Topic III.)

This is a most important phase of educational hygiene. Teaching of child hygiene should begin with the kindergarten and continue through the whole school life, supplementing the home in the establishment of good habits regarding—

A. Food. (See Section II, Outline 6.)

1. Sufficient quantity should be eaten.
2. Necessity for clean and pure food should be recognized.

A. Food—Continued.
   3. Wise selection should be emphasized (this may be demonstrated through lessons or through school lunches).
      (*a*) Diet should be varied and well balanced.
      (*b*) Emphasis should be placed on need for milk (the growth food); cocoa or chocolate may be taken; tea and coffee should be prohibited.
   4. Food should be well masticated.
B. Large amounts of water should be drunk (from 3 to 5 glasses a day).
C. Prompt voiding and regular evacuating should be insisted upon.
D. From 9 to 12 hours of sleep are necessary.
E. Fresh air is essential both day and night, and plenty of sunshine.
F. Regular exercise and rest should be taken. (See Topic IV, J, and L, 6.)
G. Voice, hearing, and vision should be given careful attention. (See Section III, Outline 2.)
H. Clothes.
   1. They may vary with season and weather.
   2. Selection.
      (*a*) Those next to skin should be porous in warm weather; part wool in cold weather.
      (*b*) Light clothes should be worn indoors: heavy, outdoor clothing in cold weather.
   3. They should always be simple; never tight.
   4. They should always be clean.
   5. Shoes should have—
      (*a*) Straight last.
      (*b*) Broad toes.
      (*c*) Low heels.
      (*d*) Sufficient length and breadth (bunions and hammertoes form easily in children).
I. Cleanliness.
   1. Body.
      (*a*) Baths should be provided, both at home and school.
      (*b*) Brushing of teeth should be taught by toothbrush drills. (See Section III, Outline 2.)

I. Cleanliness—Continued.
   1. Body—Continued.
      (*c*) Washing before and after meals should be an established habit.
      (*d*) Washing after use of toilet should be emphasized.
      (*e*) Use of handkerchief for sneezing and blowing the nose should be taught.
      (*f*) Sucking fingers, pencils, etc., should be discouraged.
      (*g*) Smoking should be prohibited.
   2. Clothes.
      (*a*) Frequent change of underclothes and stockings.
      (*b*) Outer clothes preferably made of washable material.
   3. Animal pests.
      (*a*) The child should be instructed concerning the danger from flies, mosquitoes, rats, etc.

J. Physical education.
   1. Correct posture and carriage should be taught both at home and at school. (See Bancroft.)
   2. Play should be directed.
   3. Athletics should be organized through clubs, etc.
   4. Folk dancing is a good recreative exercise.
   5. Regular exercises and formal drills should be given as correctives.
   6. Gymnastic exercises should be adapted to meet individual needs.
   7. Swimming should be taught where possible.
   8. Body protection.
      (*a*) Protection against fire.
         (1) Prevention habits should be taught—proper disposal of matches or burning material, etc.
         (2) Fire drills should be held at frequent intervals.
      (*b*) Conduct in regard to transportation.
      (*c*) Action in emergencies ("first aid").

K. Sex hygiene should be included in study of physiology. (See Section II, Outline 7.)

L. Mental hygiene.
   1. Subjects studied should be fitted to mental development and tendencies of child. Promotion should be only according to ability.

L. Mental hygiene—Continued.

2. A cheerful and calm attitude of both teacher and pupil should be maintained. There should be no overcrowding of program, or worry and nervousness over examinations.
3. Promptness should be insisted on. Discourage "putting off."
4. Cooperation of pupils, teacher, and parents in discipline should be urged.
5. Correct study habits.
   (*a*) Specific time should be devoted for study.
   (*b*) Concentration should be taught. Avoid useless repetition.
   (*c*) "Cramming" should be discouraged; it should not be necessary.
6. Prevention of mental as well as physical fatigue.
   (*a*) Periods should be not longer than 40 minutes.
   (*b*) Time for relaxation should be taken between recitations.
   (*c*) Home study should be limited, and where possible discouraged.
   (*d*) Time should be allowed for sufficient fresh air, exercise, recreation, and rest.
   (*e*) Holidays and vacations.
      (1) Continuous sessions with short vacations are being tried out. (See "Continuous-session schooling.")
7. Vocational guidance.
   (*a*) Any real, obvious bent is lacking in most children.
   (*b*) The child should be informed of the possibilities open to him.
   (*c*) There is need of investigation and research on subject.

M. Incentives for habit formation.

1. Self-kept records of daily hygienic living. (See Brown.)
2. Health grading and competitive self-marking systems.
3. Graphs devised for showing results.
4. Honors to leaders and those showing greatest improvement.
   (*a*) Buttons, stars, badges, medals, etc.

M. Incentives for habit formation—Continued.
4. Honors to leaders, etc.—Continued.
(*b*) Rolls of honor.
(*c*) Prizes.
5. Case system of teaching.
6. Special lectures.
7. Exhibits, demonstrations, bulletin-board notices, posters, textbooks.
8. Daily inspection of hands, face, teeth, and nails (competing groups have been successfully used).
9. Dramatizations; essays.
10. Health week.
11. Moving pictures on care of teeth: importance of drinking milk; prevention of tuberculosis; "Safety first"—sex hygiene, etc.

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V. HYGIENE OF THE TEACHER

This problem covers numerically about half a million teachers in the public schools alone. At present there exists among teachers a large amount of preventable sickness, both physical and mental, which incapacitates them for their profession. To better these conditions the following should be considered.

A. Personal fitness.
B. Hygienic habits. (See Topic IV, A–H.)
C. Training.
D. Conditions of work.

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VI. HEALTH SUPERVISION OF SCHOOLS.

A. Initiation or expansion may often be furthered by a health census of the community; newspaper discussion of work carried on, and comparison of recent reports with preceding ones; publicity on work done in other places; and meetings telling of needed work. (See Rapeer, p. 228.)

B. Personnel. (See Topic II, F, 1, 4, 5, 6.)

1. Minimum requirement. (See Minimum Standards for Child Welfare.)
   - (*a*) Full-time nurse to give instruction in personal hygiene and diet, to make home visits to advise and instruct mothers in principles of hygiene and nutrition, and to take children to clinics with permission of parents.
   - (*b*) Part-time physician with one full-time nurse for not more than 2,000 children (if physician is not available, one school nurse for every 1,000 children); or full-time physician with two full-time nurses for every 4,000 children.

2. Staff needed for large school system:
   - (*a*) Director.
   - (*b*) Chief medical inspector.
   - (*c*) Assistant medical inspector.
   - (*d*) Nurses to assist in examinations, treat minor ailments, make home visits, and make certain examinations (eyes, teeth, and for pediculosis) to save doctor's time. (Vision tests may be given by teachers.)
   - (*e*) Dentists and dental assistants.

C. Equipment.

1. Room.
   - (*a*) At least 20 feet long.
   - (*b*) Plenty of light.

C. Equipment—Continued.
1. Room—Continued.
(*c*) Running water and toilet facilities.
(*d*) Soap and towels.
(*e*) One table.
(*f*) At least four straight chairs.
(*g*) One plain wicker sofa.
(*h*) One lock cabinet for supplies.
(*i*) Screen or space surrounded with wash curtains.
(*j*) Racks or hooks for hanging garments.
2. Scales and standard measuring rod.
3. Vision test cards.
4. Pocket electric lights or head reflector with proper lighting.
5. Supply of wooden spatulas.
6. Record and notification cards.
7. Filing cabinets.
8. First-aid kit.
9. Dentist chair and supplies (when dental work is planned).
10. Appliance for sterilizing.
11. Few drugs and ointments.
12. Notices, dodgers, and posters.
13. Prizes, or other rewards: Badges, buttons, etc.

D. Standardization of service.
1. Preliminary meetings of all the staff, including teachers, should be held.
2. Doctors should agree on diagnoses; uniform standards should be adopted.
3. Symptom charts for use of teachers should be provided. (See Hoag.)

E. Measures forming important part of system. (See Rapeer, p. 202.) Certain amount of ingenuity and variation of plans is desirable in arranging schedules for different localities and in the same localities from year to year.
1. Careful system of records should be kept, insuring following up of cases from year to year. (Continuous health records for each child should be kept on file with other records of pupil.)
2. Methods for guarding against infection.
(*a*) Examination should be made for, and assurance should be had of, proper vaccination. (Free vaccination against smallpox should be given.)

E. Measures forming important part of system—Continued.

2. Methods for guarding against infection—Continued.

(*b*) Routine examination of every child should be made at beginning of school session and after every vacation.

(*c*) Visit should be made by nurse of every child absent two days.

(*d*) Examination should be made by doctor of every child returning after absence of two days.

(*e*) Examination of any suspicious cases should be observed by teacher.

(*f*) Cultures should be taken to detect "carriers" (persons harboring bacteria, but not manifesting disease), if typhoid or diphtheria occurs. The Shick test should be used to determine children susceptible to diphtheria.

(*g*) Diagnosed and suspicious cases should be excluded.

(*h*) Typhoid inoculations should be made and diphtheria antitoxin should be administered when indicated. (See Section III, Outline 4. Topic I.)

3. Noncontagious defects should be determined by complete physical examination by physician and nurse of every child once a year, with determination of weight and height at beginning and end of each school year. (Monthly weighing is recommended where possible.)

4. Treatment.

(*a*) Recommendation for treatment for all remediable defects, diseases, deformities, and malnutrition should be made to parents.

(*b*) School clinics are proving to be the most effective and economical means of treating dental decay, and likewise minor surgical and parasitic conditions.

(*c*) Open-air classes with rest periods and supplementary feedings for pretuberculous and certain tuberculous children, and children with grave malnutrition should be established.

(*d*) School lunches, or hot noonday meals, should be provided.

(*e*) Follow-up work by a nurse can not be too strongly emphasized. The nurse is one of the chief agents in seeing that the physician's

E. Measures forming important part of system—Continued.

4. Treatment—Continued.

recommendations are carried out. She is the determining factor between failure and success in effecting cures. Without a nurse, from 15 to 25 per cent of the corrections are made; with a nurse, from 75 to 90 per cent are made.

(*f*) Parents should be educated by means of parent and teacher associations, notices for treatments sent to the parents, conferences, house visits by nurse, and consultations with physician.

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Rapeer, cited above, pp. 110–126; 197–230.

OUTLINE 2. HYGIENE OF THE SPECIAL SENSES AND THE TEETH.

The hygiene of the eye, ear, and upper respiratory passages presents problems of signal importance in relation to the growing child. Physical development and mental progress are absolutely dependent on the healthy condition of these organs. Information and training as to their care should be given all children, and responsibility for proper medical treatment should be assumed where necessary. This is particularly a social duty, because with community conditions such as those under which so many of our children live, minor defects and ailments are very likely to be overlooked, or definitely disregarded, thus laying a foundation for future ill-health.

I. EYE.

A. Anatomy.

1. The eyeball with the lens is an optical instrument comparable with the photographic camera. It is fastened in a socket with muscles provided for mobility, and

A. Anatomy—Continued.

is connected with the brain by the optic nerve. Under ordinary conditions, the eyes function in coordination, supplying binocular vision. (See May, plate 1, pp. 308–315.)

2. Other structures to be defined are:

(*a*) The conjunctiva is the mucous membrane covering the eyeball and inside of eyelids.

(*b*) The sclera is the white of the eyes.

(*c*) The cornea is the superficial, transparent, portion of the eyeball.

(*d*) The iris is the colored part of the eye.

B. Development.

In infancy and childhood the eye is not wholly developed. At first it has a short axis, which makes it ill adapted for distant vision. In spite of the fact that accommodation is greatest in childhood, becoming progressively less with years, the delicate structures of the eye are easily strained in youth by close work. Therefore, during early childhood, up to the fifth year, the eye should not be subjected to any taxing effort. During the school years great care should be taken that the eyes are used properly. (See Topic G.)

C. Possible anatomic defects.

1. Farsightedness, or hyperopia, short axis—flat eyeball.
2. Nearsightedness, or myopia, long axis.
3. Astigmatism—unequal focus in the eyeball.

D. Characteristics of the healthy eye.

1. Appearance.

(*a*) The healthy eye is clear and bright.

(*b*) The white (sclera) is not suffused, reddened, or jaundiced.

(*c*) The edges of the lids show a healthy skin.

2. Correct vision (emmetropia).

(*a*) The standard: Letters 10 millimeters high may be seen at a distance of 20 feet. (Standard Snellen test types may be obtained from any optician.)

(*b*) Reading may be maintained for several hours without fatigue.

E. Eye strain.

Such a condition is the result of abnormality, or refractive error.

1. Signs and symptoms.

(*a*) Local.

(1) Congestion, inflammation, rawness.

E. Eye strain—Continued.
1. Signs and symptoms—Continued.
(*a*) Local—Continued.
(2) Crusted lids, scales at roots of eyelashes (blepharitis).
(3) Styes.
(4) Crossed-eyes, squint, wall-eye (either eye deviating from normal position).
(5) Painful eyes.
(6) Itching, smarting, or watering.
(7) Sensitiveness to light.
(8) Frowning, or the necessity of holding a book too near the eyes (less than 12 inches) in order to read.
(9) Blurred or double vision.
(10) Lack of binocular vision.
(*b*) General.
(1) Headaches.
(2) Feelings of fatigue and exhaustion.
(3) Irritability.
(4) Motor disturbances—tics, twitchings.
(5) Indigestion.
(6) Dizziness.
2. Treatment.
(*a*) Prompt consultation with first-class oculist.
(*b*) Glasses, if prescribed.
(*c*) In case of inflammation of the lids, or conjuctivae, special attention to the diet.
(*d*) Complete rest, then proper use. (See Topic F.)

F. Proper use:
1. Position.
(*a*) The position of the head should be in proper relation to the book and body.
(*b*) The body should not be bent over the book.
2. Light.
(*a*) Diffused daylight is best. There should be a sufficient quantity, but it should not be too bright.
(*b*) The proper direction for reading is from behind or at one side; for writing, at the left side—never from the front.
(*c*) Glares, reflections, cross lights, shadows, and sudden, strongly contrasted changes (flickers) should be avoided.

F. Proper use—Continued.

3. Time.

(*a*) Fatigue, feeling of strain, smarting, or other symptoms coming with too prolonged use should be avoided.

4. Cleanliness.

(*a*) Individual towel and soap should be used.

(*b*) Only own handkerchief should be used.

(*c*) Hands should be kept away from face.

5. General measures of hygiene.

(*a*) The child should have plenty of sleep.

(*b*) He should have fresh air day and night.

(*c*) He should have sufficient wholesome food. (See Section II, Outline 5, Topic III.)

G. Common pathologic conditions.

1. Ophthalmia neonatorum is the purulent infection of the eyes of the new-born child. (See May, pp. 107–110; see Section I, Outline 6, Topic V, A, 3; Section III, Outline 4, Topic V, B.)

(*a*) It is caused by a gonococcal infection usually of the genital tract of the mother.

(*b*) The symptoms are redness, swelling, and profuse discharge of pus.

(*c*) Prevention consists in dropping a silver salt in the infant's eyes immediately after birth.

(*d*) Treatment must always be prompt and under the direction of a physician.

2. "Pink eye," or acute conjunctivitis, is most contagious (children having this infection should be isolated). (See May, pp. 96–99.)

3. Trachoma, or granular lids. (See May, pp. 113–118; Oakley, Moore, and Kolb; also Concerning Common Causes of Blindness in Children and the Means and Methods of Prevention.)

4. Subconjunctival hemorrhages are sometimes caused by coughing of whooping cough.

5. In measles, the eyes are usually affected. If conjunctivitis, or inflammation of the cornea, is present, children should not be exposed to bright light and the eyes should not be used for reading for at least two weeks. In debilitated children the condition is more serious, often becoming chronic.

6. A foreign body in the eye should be immediately and carefully removed.

(*a*) When not imbedded. (See Woodward, p. 206.)

G. Common pathologic conditions—Continued.
6. A foreign body in the eye, etc.—Continued.
(*b*) When imbedded, professional attention is necessary.

H. Social aspects of hygiene of vision.
1. A great amount of blindness from gonorrhea is preventable. Its cost is enormous.
2. Retardation and extra schooling from defective eyesight involve a large expense.
3. Industrial impairment of vision is especially to be condemned where children are concerned. It may be due to—
(*a*) Strain from too long application at close work, or use of eyes with poor illumination.
(*b*) Mechanical accidents.
(*c*) Poisons—fumes from wood alcohol, etc.

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II. UPPER RESPIRATORY PASSAGES AND EAR.

The nose, pharynx, throat, and ears represent a series of passages and chambers of the body, all more or less communicating with one another, whose functions are very closely intermingled. When in healthy condition they are lined with a continuous layer of mucous membrane, and with them are associated various groups of lymph glands. The respiratory organs, owing to their position and functions, form the main portal by which disease germs enter the body. Their care, therefore, is particularly important,

as the lining membranes when intact and in healthy condition form an efficient barrier to bacteria.

A. General considerations.

1. In the study of the anatomy of these organs, note especially the meaning of septum, turbinates, pharynx, adenoids, tonsils, larynx, Eustachian tubes, middle ear.
2. Observe the continuity of the nasal passages to the nasal sinuses and adenoid cells and of the ear to the mastoid cells.

B Nose.

1. Function.

   The nose prepares the breathed air so that the oxygen in it may be best assimilated by the lungs. This is done by—

   (*a*) Cleaning, or filtering.
   (*b*) Warming.
   (*c*) Moistening.

2. Hygiene.

   (*a*) Correct breathing. During the first few weeks of life the mucous secretion may be slightly increased, causing mouth breathing. If this persists, a physician should see that no obstruction exists. Every effort should be made to prevent the child from forming mouth-breathing habits.

   (*b*) Cleaning.

   (1) For infants and small children, cotton wrapped on toothpick and inserted short distance.
   (2) For older children, gentle blowing, one nostril at a time.
   (3) There is danger of infecting the middle ear through Eustachian tube with forceful blowing.
   (4) Picking at nose, snuffling, and swallowing discharges should be guarded against.

   (*c*) General measures.

   (1) Breathing as fresh and pure air as possible.
   (2) Keeping up general conditions—exercise, rest, sleep, wholesome food, etc.

B. Nose—Continued.

2. Hygiene—Continued.

(*d*) Defective development.

(1) Narrow or distorted nasal passages, deviate septum, septal spur.

(2) High palate, or split palate.

(*e*) Infectious conditions and sequela.

(1) "Snuffles" from a persistent increase in mucous secretion in a young baby may be one of the symptoms of congenital syphilis.

(2) The earliest and most significant symptom of nasal diphtheria is a bloody discharge.

(3) Colds—rhinitis, coryza, and infection of the mucous membranes lining the nose are common and should not be neglected.

a Types: Acute; chronic.

b Symptoms: Mucous and purulent discharges.

c Dangers resulting: Sinus infections; diseased adenoids and tonsils; enlargement of turbinates and septum; and bronchitis and pneumonia.

d Differential diagnosis: When a person with a cold has a fever and feels sick secure the services of a doctor to ascertain that no more serious condition is present.

e Treatment: General measures to build up health; palliative measures during acute infectious conditions, on advice of physician; inhalations, sprays, local applications, and washes which may be soothing, antiseptic, or mechanically cleansing (owing to the position of Eustachian tubes care must be taken when washing nose not to allow fluid to run back into

B. Nose—Continued.

2. Hygiene—Continued.

(*e*) Infectious conditions and sequela—Continued.

middle ear; holding the head forward helps to prevent this: see Coolidge, pp. 339–349); surgical interference for relief of chronic conditions.

(*f*) Special conditions.

(1) Nose bleed, or epistaxis. (See Coolidge, pp. 86–90.)

(2) Foreign bodies in nose. (See Coolidge, pp. 134–135.)

(3) Hay fever, a noninfectious inflammation of the nasal mucous membranes (this is caused by a sensitiveness to foreign proteins).

(4) Nasal and pharyngeal mucous membranes of healthy people harboring organisms of serious epidemic diseases: meningitis, streptococcus infection, poliomyelitis, which only need contact with a susceptible person to become virulent.

C. Adenoids.

Enlargement of the lymphoid, or adenoid tissue at the back of the nose frequently develops into a cauliflowerlike growth where the throat and nose join, forming an obstruction to nose breathing and normal oxidation of the air in the lungs. This is usually the seat of infection and is often associated with enlarged tonsils.

1. Symptoms.

(*a*) Familiar adenoid face of dullness and apathy, lips dry, nasolabial folds drawn down, eyes dull and heavy, giving the face a stupid expression.

(*b*) Crowded teeth (the upper jaw may become permanently narrowed and deformed).

(*c*) Mouth breathing asleep or awake, or both.

(*d*) Nasal discharge.

(*e*) Frequent colds.

(*f*) Deafness, or impaired hearing (estimated in two-thirds of adenoid cases). (Adenoids may obstruct Eustachian tubes.) Running ears, retracted eardrums.

C. Adenoids—Continued.

1. Symptoms—Continued.

(*g*) Difficulty in learning (apparent stupidity).

(*h*) Frequent headaches.

2. Care.

(*a*) Adenoids should be removed as soon as possible (a child does not "outgrow" them). They may result in permanent deformity.

D. Ears.

1. Hygiene.

(*a*) To clean ear of infant, a wad of cotton wrapped around a toothpick made large enough to prevent entering into the ear passage may be used (no one but a physician should insert anything into the canal).

(*b*) In older children, wax may become embedded in the auditory canal, causing temporary deafness. This may be removed by softening it with peroxide and irrigating the canal with warm water by ear syringe.

2. Infectious conditions.

(*a*) Infections of the ear come from infections of the nasal passages through the Eustachian tube.

(*b*) Acute and chronic earache, otitis media, forms one of the most painful common ailments of childhood.

(*c*) It is never unimportant and should never be neglected, as it may lead to bad abscess, ruptured drum membrane, destruction of middle ear parts, permanent deafness, or mastoiditis, or meningitis.

(*d*) Treatment.

(1) A physician should be consulted.

(2) If an abscess has ruptured, free drainage should be assisted by leaning the head to that side.

(3) Steaming, or gentle irrigating with sterile solutions sometimes alleviates pain. (Only mild antiseptics should be used.)

E. Throat and pharynx.

1. Training.

(*a*) A low, well-modulated tone of voice and clear enunciation should be developed. (Voice

E. Throat and pharynx—Continued.

1. Training—Continued.

training is normally closely associated with hearing.)

(*b*) Cultivation of singing voice not to be overlooked.

(*c*) Anomalies in training.

(1) Deaf child. (See Section VII, Outline 4; also Section IV, Outline 7.)

(2) Stammering, stuttering and other vocal tics. (A tongue that is tied may be cut.)

2. Pathologic conditions.

(*a*) "Croup" of children, a spasmodic laryngitis. (See Coolidge, pp. 263–266.)

(*b*) Sore throat, often first noticed symptom of the acute infectious diseases, measles, scarlet fever, diphtheria, and influenza. (See Coolidge, pp. 228–234.)

(*c*) Sore throat, often associated with gastro-intestinal disturbances.

(*d*) Sore throat, due to specific bacteria (streptococcus).

(*e*) Tonsillitis.

(1) Acute. (See Coolidge, pp. 186–189.)

(2) Subacute. (See Coolidge, pp. 189–190.)

(3) Chronic. (See Coolidge, pp. 197–199.)

This condition is apt to lead to enlarged tonsils. All forms are a grave menace to the health of the child. Joint trouble and heart disease may result. It should be watched carefully, especially after an acute illness, such as measles, scarlet fever, or diphtheria.

(*f*) Peritonsillar abscess, or quinsy. (See Coolidge, pp. 190–194.)

(*g*) Cervical adenitis, or the swelling of the glands of the neck.

(1) This condition may be seen or felt from the outside.

(2) It is frequently tuberculous in origin, form discharging abscesses.

(3) It may be due to diseased teeth.

E. Throat and pharynx—Continued.
2. Pathologic conditions—Continued.
(*g*) Cervical adenitis—Continued.
(4) When located at the back of the neck, it often comes from scalp infections.
3. Differential diagnosis of pathologic conditions.
(*a*) This is extremely important owing to grave possibilities.
(*b*) Where fever is present and discomfort persists, a physician should always be consulted immediately.
4. General principles of treatment of pathologic conditions.
(*a*) Croup.
(1) Relaxing steam inhalations (antispasmodic) should be given on advice of physician.
(2) Cold compresses should be placed over larynx.
(*b*) Sore throat accompanying infectious disease.
(1) Additional palliative measures should be taken.
(*c*) Other conditions.
(1) Palliative sprays, gargles, and washes.
(2) Surgical measures (removal, incision, and drainage) in the case of diseased tonsils and glands.
(3) Castor oil, large amounts of water, plenty of fresh air, rest and sleep of importance in many cases.

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III. TEETH.

A. Anatomy and development. (See Goler.)
B. Care of primary teeth. (See Section III, Outline 1, Topic IV, I, 1, b.)
1. Habits of cleanliness should be established.
(*a*) Gums should be wiped with damp cloth soon after the first teeth appear. (Care of gums is as important as care of teeth.)
(*b*) Tooth brush should be used at 12 to 18 months. A rotary motion is best.

B. Care of primary teeth—Continued.
1. Habits of cleanliness should be established—Continued.
(*c*) A cleansing mouth wash is recommended.
(1) Soda, salt, and water.
(2) Lime water.
(*d*) Early dental consultations and treatment are of importance.
2. Erroneous ideas should be combated.
(*a*) Primary teeth are very important. It is a false idea that care of them is unnecessary, as on them depends the correct shaping of the jaws in preparation for the permanent teeth; where infection is present in the primary teeth the permanent teeth become infected more easily.
(*b*) Six-year molars are not temporary teeth; they are permanent.

C. Care of permanent teeth.
1. General care.
(*a*) Teeth should be brushed twice a day at least (morning and night).
(*b*) Dental floss should be used regularly after each meal.
(*c*) Dentist should be consulted frequently (every four months).
2. Orthodontic measures should be undertaken where irregularities occur.
3. Special treatment is necessary where pyorrhea alveolaris is present.

D. Effects of bad teeth.

Diseased teeth, as foci of infection in the body, are a danger to health.
1. They may stunt growth.
2. They may cause acute or chronic disease.
(*a*) Abscesses.
(*b*) Neuralgias.
(*c*) Joint troubles.
(*d*) Heart or kidney disease.

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IV. HYGIENIC HABITS.

Hygienic habits should be begun early to become firmly grounded. A well planned daily routine is the foundation of good hygiene. Essential habits to be insisted on are—

A. Washing. Individual towel, wash cloth and soap should always be used.
   1. On rising.
   2. Before meals.
   3. After toilet.
   4. On going to bed.

B. Brushing teeth.
   1. On rising.
   2. At bed time.
   3. After meals, if possible.

C. Using handkerchief.

Every child should be provided with handkerchiefs and taught to use them properly. The nose should be blown several times each day.

D. Observing "don'ts."
   1. Do not spit.
   2. Do not put fingers in mouth.
   3. Do not pick nose, or wipe nose on hands, or sleeves.
   4. Do not put pencils, money, pins, or anything except food in the mouth.
   5. Do not exchange candy, gum, food, or any mouth toy, whistles or bean blowers.
   6. Do not cough or sneeze in a person's face (the mouth should be covered with the handkerchief, and the face turned to one side).

OUTLINE 3. INFECTIOUS DISEASES.

Infectious disease is largely preventable. The importance of the prevention and proper care of infectious diseases in childhood can not be overestimated. Thousands of young lives may be thus saved and a better state of physical and mental well-being preserved. Considering the great number of deaths which occur each year from infectious diseases, the gross physical defects which often result, and the enormous amount of energy lost, the cost of such disease is tremendous.

I. COST OF INFECTIOUS DISEASE.

A. Death.

1. For many centuries epidemics of infectious disease have spread over the world and caused innumerable deaths.
   (*a*) The "Black death," during the Middle Ages, caused the mortality of one-fourth the population of the world known at that time (over 60,000,000).
   (*b*) Smallpox, before the days of vaccination, was one of the greatest scourges, depopulating cities and exterminating nations.
   (*c*) Typhoid fever, before the institution of modern measures of sanitation, caused annually the death of hundreds of thousands.
   (*d*) Diphtheria, before the discovery and use of antitoxin, caused an average annual death rate of 79.4 per 100,000 population.
   (*e*) Recently epidemics of influenza and poliomyelitis (infantile paralysis) have swept over the country, exacting a tremendous toll of life.
2. The number of deaths from infectious diseases has markedly decreased since the development of scientific knowledge as to the way such diseases spread and the institution of measures to prevent further dissemination, particularly since the discovery and use of vaccination against smallpox, diphtheria antitoxin, and antimeningococcus serum. But there still remains a large and, in some cases, increasing number of deaths, the result of preventable infectious diseases.
   (*a*) The census statistics for the death registration area of the United States for 1919 show that the mortality from infectious diseases for that year was 286,479, as compared to a total mortality of 1,066,711—that is, more than 25 per cent of the deaths during that year were due to infectious diseases. The number of deaths from the infectious diseases for 1919 are given in Table XX.

A. Death—Continued.

TABLE XX.—*Deaths from infectious diseases in the United States registration area, 1919.*[1]

Disease.	Number of deaths.	Disease.	Number of deaths.
Tuberculosis	106,985	Meningitis	5,508
Lobar pneumonia	56,418	Puerperal septicemia	4,950
Broncho-pneumonia	40,720	Scarlet fever	2,383
Influenza	84,113	Acute anterior poliomyelitis	747
Diphtheria and croup	12,551	Gonococcus infection	621
Measles	3,296	Smallpox	358
Typhoid fever	7,860		
Whooping cough	4,714	Total	338,571
Syphilis	7,347		

[1] U. S. Bureau of the Census, Mortality Statistics, 1917, Government Printing Office, Washington, 1919, p. 318.

(*b*) With few exceptions, the course and complications of infectious disease are more severe and the mortality is greater, the younger the child.

(1) Statistics show that approximately:

(*a*) Ninety-four and eighty-five hundredths per cent of the deaths from whooping cough occur under 5 years of age.

(*b*) Seventy-six and thirty-three hundredths per cent of the deaths from measles occur under 5 years of age.

(*c*) Fifty-six per cent of the deaths from diphtheria and croup occur under 5 years of age.

(*d*) Forty-five and ninety-five hundredths per cent of the deaths from scarlet fever occur under 5 years of age.

(2) Tuberculous infection under 2 years of age is very serious and likely to be fatal.

(3) The younger the child the more likely is an infectious disease to be complicated with broncho-pneumonia, which is frequently fatal.

B. Physical defects.

Infectious diseases are often the forerunners of chronic, debilitating, and handicapping conditions. These occur for the most part in childhood.

1. Paralysis from poliomyelitis (infantile paralysis).

B. Physical defects—Continued.
   2. Chronic hydrocephalus from meningitis, with concomitant failure of mental development or mental deterioration.
   3. Blindness as a result of—
      (*a*) Gonorrhea.
      (*b*) Syphilis.
      (*c*) Meningitis.
   4. Deafness as a result of—
      (*a*) Scarlet fever.
      (*b*) Measles.
      (*c*) Meningitis.
      (*d*) Syphilis.
   5. Chronic kidney disease following scarlet fever.
   6. Bone and joint deformities from tuberculosis.

C. Loss of vitality and energy.
   1. Infectious diseases use up vitality and energy which in childhood are especially necessary for the growth and development of both body and mind. They frequently cause malnutrition and retarded development. (See Section II, Outline 6, Topic VII.)

II. CAUSE OF INFECTIOUS DISEASE.

A. Two factors are necessary to cause infectious disease:
   1. A causative microörganism or germ.
   2. A susceptible person.

B. The causative microorganisms are known for a great many of the infectious diseases; in a number they have not yet been discovered.
   1. Among the important diseases for which a causative microorganism has been found are:
      (*a*) Typhoid fever.
      (*b*) Diphtheria.
      (*c*) Cerebrospinal meningitis.
      (*d*) Tetanus.
      (*e*) Syphilis.
      (*f*) Gonorrhea.
      (*g*) Tuberculosis.
      (*h*) Pneumonia.
      (*i*) Whooping cough.
      (*j*) Poliomyelitis.
   2. Among the important diseases for which a causative organism has not been discovered are:
      (*a*) Smallpox.
      (*b*) Measles.
      (*c*) Scarlet fever.

C. The susceptibility of a person or its converse—his immunity—is the factor which determines whether the one who is exposed will contract a particular disease. Immunity, or resistance as it is commonly called, may be natural or acquired.

1. Natural immunity is the power of resisting infection with which a person is born.

(*a*) Examples of natural immunity are numerous.

(1) Man does not spontaneously contract a great many of the infectious diseases of animals and vice versa.

(2) Certain races are more or less susceptible to certain infectious diseases than to others.

(3) Certain persons are susceptible, others are immune, to a particular infection.

(*b*) The factors involved in the natural resistance of a person are of the utmost importance.

(1) In general, susceptibility to disease is in inverse relation to the mental and bodily vigor of the individual.

(*a*) Fatigue, undernutrition, and disorders of nutrition, worry, and alcoholic excesses tend to increase susceptibility to disease.

(*b*) Local disorders, particularly about the mouth, nose, and throat, the most common portals of entry of infection, diminish resistance. (Examples: Chronic nasal catarrh, adenoids, chronically infected tonsils, and carious teeth.)

(*c*) One infectious disease often predisposes a person to others. (Examples: Measles often increases a susceptibility to diphtheria; whooping cough and measles to tuberculosis.)

(2) Age in itself is a factor in determining susceptibility to infectious disease.

(*a*) The new-born baby and nursling has an immunity to

C. The susceptibility of a person or its converse, etc.—Continued.
1. Natural immunity, etc.—Continued.
(*b*) The factors involved, etc.—Continued.
(2) Age, etc.—Continued.
many of the infectious diseases, transmitted through the mother. This immunity wears off during the first and second years. (See Section II, Outline 1, Topic IV, C. 2.)
(3) Environment has an important influence on individual susceptibility.
(*a*) A healthy environment, providing abundance of fresh air and sunshine, increases resistance.
(*b*) Insanitary conditions, overcrowding, overheated and underheated dwellings diminish resistance.
2. Immunity may be acquired.
(*a*) The result of a previous attack of the disease.
(1) Many infections occur as a rule but once in an individual despite subsequent exposure. (Examples: Measles, scarlet fever, whooping cough.)
(*b*) The result of a mild, atypical, unrecognized attack of the disease.
(1) The resistance which many adults have to such diseases as diphtheria, poliomyelitis, scarlet fever, and whooping cough, may represent an immunity acquired in this way.
(*c*) The result of protective inoculation.
(1) The most notable example of this is vaccination against smallpox.
(2) Other examples are typhoid inoculation, temporary immunization against diphtheria with antitoxin, prolonged immunization with "toxin — antitoxin" mixture, and whooping cough vaccine.

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III. SOURCE AND MODE OF TRANSMISSION OF INFECTIOUS DISEASE.

A. Known sources of infectious disease.

1. Man himself. ("Man is the great source and reservoir of human infection.")

(*a*) Most of the communicable diseases of man, especially those which occur in epidemic form, are peculiar to man. Examples are:

(1) Typhoid fever.
(2) Cholera.
(3) Malaria.
(4) Syphilis.
(5) Mumps.
(6) Measles.
(7) Scarlet fever.
(8) Typhus fever.
(9) Poliomyelitis.
(10) Smallpox.
(11) Chicken pox.
(12) Diphtheria.
(13) Tuberculosis, in large part.

(*b*) The important channels by which infection may enter and leave the body are:

(1) Nose, throat, and mouth.
(2) Anus.
(3) Urethra and vagina.
(4) Skin.

(*c*) A "carrier," or a person who harbors and discharges the organisms of a disease, without showing evidence of the corresponding infection, is a frequent source of some infectious diseases.

(1) Carriers are noteworthy in—

(*a*) Typhoid fever.
(*b*) Diphtheria.
(*c*) Poliomyelitis.
(*d*) Scarlet fever.
(*e*) Cerebrospinal meningitis.

A. Known sources of infectious disease—Continued.
1. Man himself—Continued.
(*c*) A "carrier," etc.—Continued.
(2) Carriers may be—
(*a*) Temporary:
i. Following an attack of the specific disease.
ii. Following contact with a diseased person or his discharges.
(*b*) Chronic.
2. The lower animals.
(*a*) There are a number of diseases which man may contract from the lower animals.
(1) Of these, tuberculosis from cattle through infected milk is the most important.

B. Mode of transmission.
1. So-called "contact" infection.
(*a*) By this method the infection is spread more or less directly or indirectly from a person ill with the disease, or a carrier, to a healthy individual.
(1) Direct, or actual contact, as in kissing.
(2) Indirect, through—
(*a*) Soiled hands.
(*b*) Contaminated towels.
(*c*) Infected cups, spoons, toys, etc.
(*d*) Remnants of food and other objects which have recently been handled by an "infected" person.
(*e*) So-called "droplet" infection, whereby through sneezing and coughing infected droplets are carried through the air from one person to another.
(*b*) This mode of transmission plays a dominant rôle in—
(1) Diseases in which the infecting agent leaves the body in discharges from the mouth and nose, namely:
(*a*) Tuberculosis.
(*b*) Diphtheria.

B. Mode of transmission—Continued.
1. So-called "contact" infection—Continued.
(*b*) This mode of transmission, etc.—Continued.
(1) Diseases, etc.—Continued.
(*c*) Scarlet fever.
(*d*) Measles.
(*e*) Influenza.
(*f*) Common cold.
(*g*) Cerebrospinal meningitis.
(*h*) Whooping cough.
(*i*) Mumps.
(2) Diseases in which the infecting agent leaves the body in the intestinal and bladder discharges, such as:
(*a*) Typhoid.
(*b*) Dysentery.
(*c*) Cholera.
(*d*) Other intestinal infections.
(3) Diseases in which the infecting agent is in the skin, such as:
(*a*) Smallpox.
(*b*) Chickenpox. (The organism may leave the body by one or more routes.)
2. Indirect transmission.
(*a*) By this method, water, food, and soil act as vehicles for the transmission of infectious material.
(1) Contaminated water is an important agent in the dissemination of certain diseases. Among the important diseases which may be transmitted by this means are:
(*a*) Typhoid fever.
(*b*) Cholera.
(*c*) Dysentery.
(2) Food, especially milk, is a most important agent in the transmission of disease.
(*a*) Tuberculosis, both human and bovine, typhoid fever, diphtheria, scarlet fever, septic sore throat, some of the summer complaints of children,

B. Mode of transmission—Continued.
2. Indirect transmission—Continued.
(*a*) By this method, etc.—Continued.
(2) Food, etc.—Continued.
(*a*) Tuberculosis, etc.—Continued. and dysentery, are commonly carried through contaminated milk.
(*b*) Other foods may be contaminated in handling by a person who is diseased, or a carrier.
(3) Soil polluted with excreta may be the source of—
(*a*) Hookworm disease which is contracted directly through soil polluted with human excreta.
(*b*) Typhoid fever, cholera, and dysentery, which are usually contracted indirectly through infection of drinking water with polluted soil; occasionally through flies or other mechanical means of transference.
(*c*) Tetanus, the organism of which is deposited in the soil, largely in the excreta of herbivorous animals.
(*b*) The infection through these agents is in the majority of cases from human sources.
(1) Infected water and soil are with few exceptions, such as tetanus, practically always contaminated by human excreta.
(2) Milk, except in the case of bovine tuberculosis and a few rare diseases of cattle which may be transmitted to man, is usually contaminated by persons handling the milk in its transit from cow to consumer, and by contamination of the vessels with infected water.

B. Mode of transmission—Continued.
   2. Indirect transmission—Continued.
      (*c*) Insects and other animals may act as transmitters of certain diseases. The most important are:
         (1) Malaria (transmitted by the mosquito).
         (2) Yellow fever (transmitted by the mosquito).
         (3) Typhus fever (transmitted by the body louse).
         (4) Bubonic plague (transmitted by the rat).

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IV. SYMPTOMS OF INFECTIOUS DISEASE IN CHILDHOOD.

A. The symptoms of infectious disease are varied, and are dependent on the nature and severity of the infection.
   1. Each acute infection has a typical course and picture from which there are many variations.
   2. Sometimes the disease is so mild that it is not recognized except during an epidemic, or until an exposed person develops a more outspoken case, or some late complication sets in.
   3. Infections which may be chronic, such as tuberculosis and syphilis, may have the appearance of malnutrition or other diseases for a long time before their real nature is discovered.

B. The most common general symptoms are:
   1. Fever.
   2. General discomfort.
   3. Restlessness or drowsiness.
   4. Gastrointestinal disorders.
      (*a*) Vomiting.
      (*b*) Diarrhea or constipation.
      (*c*) Lack of appetite.
   5. Convulsions.

C. Local symptoms vary with the specific disease. The most common ones are:
   1. Cold in the head.
   2. Sore throat.
   3. Cough.
   4. Skin eruption.

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V. CARE OF INFECTIOUS DISEASE.

A. There are two fundamental purposes in the care of infectious disease.
   1. To prevent the spread of the infection.
   2. To bring the patient back to health with as little wear and tear as possible.

B. The prevention of the spread of infection is attained by considering the patient, the nurse or attendant, and the sick room itself as the special sources of danger.
   1. The patient.
      (*a*) A child who seems ill, particularly one with a "cold" or sore throat, should be kept in a room alone until the diagnosis has been determined.
      (*b*) A child ill with a definite contagious disease should be kept isolated until the physician or health officer has pronounced that the danger of communication is over.
      (*c*) All discharges from the nose and throat should be caught on cheesecloth or old cotton, which can be burned.
      (*d*) Urine and stools should be disinfected with a disinfectant, such as a solution of carbolic acid (1 part to 20 parts of water).
      (*e*) Clothing and bedding should be soaked in a disinfectant, such as carbolic acid solution (1 part to 20 parts of water), and then boiled before washing.
   2. The nurse.
      (*a*) The nurse should wear a washable gown and cap. These should completely cover the body and hair, and should be put on before entering the sick room and left at the door before leaving the room.

B. The prevention of the spread of infection, etc.—Continued.

2. The nurse—Continued.

(*b*) She must be careful to scrub her hands thoroughly with hot water and soap, and soak them in disinfectant solution, such as a solution of bichloride of mercury (1 part to 2,000 parts of water), on leaving the room.

(*c*) She should see that all infectious material coming from the patient is properly disposed of.

3. The sick room.

(*a*) All unnecessary furniture, carpets, hangings, and ornaments should be removed.

(*b*) The room should contain plenty of fresh air and sunshine ("nature's disinfectants"); windows should be screened in summer.

(*c*) The floor and woodwork should be dusted once or twice a day with a damp cloth, preferably one moistened with a disinfectant, such as carbolic-acid solution (1 part to 40 parts water). Sweeping and dry dusting should be avoided.

(*d*) After the patient leaves the room—

(1) It should be allowed to air completely for two or three days.

(2) Everything possible should be boiled.

(3) Walls, woodwork, floor, and furniture should be washed thoroughly with carbolic-acid solution (1 part to 20 parts of water), or bichloride of mercury solution (1 part to 1,000 parts of water), then thoroughly scrubbed with hot water and soap.

(4) Mattress and such bedding as can not be boiled should be burned, if the contagion is a severe one; otherwise thoroughly aired in sunshine. (Fumigation is now being abandoned by health authorities; its effect as a disinfectant can not equal thorough washing and sunlight.)

C. The treatment of the patient involves:

1. Good general nursing care under a physician's directions.

(*a*) The child should be in bed at least one week after the temperature is normal and symptoms have subsided.

C. The treatment of the patient involves—Continued.

1. Good general nursing, etc.—Continued.

(*b*) A young baby should be held in the arms at frequent intervals.

(*c*) Food should be light.

(1) An infant's food, if artificial, should be diluted.

(2) An older child should have only milk, broths, and soft solids.

(*d*) Water should be given in abundance.

(*e*) The bowels should be kept open.

(*f*) A sponge bath may be given once or twice daily, unless the physician disapproves.

(*g*) Local symptoms and complications have to be treated as they arise.

2. Specific treatment should be given in special diseases.

(*a*) Antitoxin should be administered in diphtheria.

(*b*) Antimeningococcus serum in epidemic meningitis.

(*c*) Group I, antipneumococcus serum, in pneumonia, due to Group I, pneumococcus.

(*d*) Tetanus antitoxin in tetanus.

(*e*) Antirabies treatment for mad-dog bite.

(*f*) Antipoliomyelitis serum (there is, as yet, no agreement among physicians as to its efficacy).

(*g*) Whooping-cough vaccine. (Value in prophylaxis seems reasonably certain; in treatment doubtful.)

(*h*) Quinine, in malaria.

(*i*) Mercury and salversan in syphilis.

(*j*) Vermifuge, for various intestinal parasites.

(*k*) Convalescent serum. (Blood serum of persons recovering from a particular disease has been used in some cases of scarlet fever, poliomyelitis, and influenza with apparent benefit. Its use is obviously limited.)

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WILSON, J. G.: Infectious Diseases of Children, U. S. Public Health Service, Public Health Bulletin No. 95, 1918.

VI. CONTROL OF INFECTIOUS DISEASES.

A. Reduction of the incidence of disease.

1. By measures calculated to prevent the exposure of persons to infectious material.

(*a*) Isolation of persons ill with infectious disease during their period of infectivity and of non-immunes who have been exposed during the incubation period of the disease.

(1) Isolation of the ill person serves the following purposes:

(*a*) Destruction of infectious material at its source.

(*b*) Prevention of exposure of patient to other infection.

(2) Isolation of exposed persons during the period of incubation is most effective in the prevention of the spread of diseases, such as measles and whooping cough, which are infectious during the early and often unrecognized stages.

(3) Isolation, unfortunately, does not eliminate the carriers and mild unrecognized cases which act as sources for a number of diseases.

(*b*) Social measures.

(1) Elimination of overcrowding and promiscuous contact which favors "droplet" infection and gives the carriers opportunity to spread disease.

(2) The development in the person of a "social conscience," so that he voluntarily attempts to prevent the spread of even so common an infection as the cold.

(*c*) Use of pure water and food, milk in particular.

2. By measures calculated to increase the resistance of the individual.

(*a*) Building up general well-being.

(1) Prevention of anæmia, overfatigue, and exposure to wet and cold.

(2) Preservation of normal healthy condition of the nose, throat, and mouth.

A. Reduction of the incidence of disease—Continued.
  2. By measures calculated to increase the resistance of the individual—Continued.
    (*a*) Building up general well-being—Continued.
      (3) Establishment of a healthy environment.
        (*a*) Plenty of fresh air and sunshine.
        (*b*) Freedom from dust.
        (*c*) Avoidance of overheated dwellings.
    (*b*) Production of immunity by inoculation when possible.
B. Reduction of the mortality.
  1. By careful nursing and general care.
  2. By prompt and vigorous specific treatment when applicable.
C. Such preventive and therapeutic control is made effective by—
  1. An efficient community, State, and Federal health administration, supported by legislation.
    (*a*) To require the immediate reporting of all cases of contagious diseases. (See The Notifiable Diseases.)
    (*b*) To require satisfactory isolation at home, or in a hospital.
    (*c*) To investigate the sources of contagion and take all necessary measures to prevent its spread.
      (1) Isolation for a suitable period of non-immune persons who have been exposed.
      (2) Prevention of the spread of contagion through food and milk handlers.
      (3) Provision for medical inspection of schools and playgrounds.
    (*d*) To provide for the inspection and sanitary regulation of the water and food supplies.
    (*e*) To provide experts in the diagnosis and treatment of contagious disease and suitable public isolation hospitals.
  2. An intelligent and cooperative public which is—
    (*a*) Aware of the danger of infectious disease.
    (*b*) Eager to cooperate in all community and private activities to prevent its spread.

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OUTLINE 4. COMMON COMMUNICABLE DISEASES OF CHILDHOOD.

The early recognition of infectious disease is important both for the treatment and future well-being of the patient and the protection of the community. A general idea of the common infectious diseases—their manifestations, course, and control—will enable the mother, nurse, or teacher to know when to take the first steps for the benefit of the sick child and the protection of his associates.

I. THE SO-CALLED "CHILDREN'S DISEASES."

A. The eruptive fevers, or exanthemata—measles, German measles, scarlet fever, smallpox, chicken pox. They have in common the following characteristics:
   1. The occurrence of an eruption, or exanthema on the skin.
   2. No known causative organism.
   3. Definite communicability.

B. Acute infections of the nervous system:
   1. Acute cerebrospinal meningitis.
   2. Acute anterior poliomyelitis.

C. Unclassified:
   1. Diphtheria.
   2. Whooping cough.
   3. Mumps.

A tabulation of the most important facts concerning these diseases is given in Table XXI.

TABLE XXI.—*Important facts concerning so-called "children's diseases."*

Disease.	Cause.	Prevalence.	Susceptibility.	Mode of infection.	Period of infectivity of patient.	Incubation period.	Salient features.	Measures of control.
Epidemic cerebrospinal meningitis (spotted fever).	Meningococcus	Epidemic usually in winter or spring. Sporadic cases, especially after epidemic at any season.	50 per cent of cases occur in children under 5 years; 12 per cent under 1 year; no age is immune.	Contact with the discharges, especially those from nose and throat of persons ill with the disease and healthy carriers, either directly or through droplet infection from sneezing and coughing. (It has been estimated that healthy carriers are ten times more numerous than persons with recognized cases.)	As long as meningococcus can be recovered from the posterior nasopharynx.	2 to 10 days; usually 7 days.	Onset sudden with fever, vomiting, severe headache, chill, or convulsion; intense sensitiveness to motion, early delirium or coma, tiny hemorrhages into the skin, rigidity of neck and extremities, rapid pulse, irregular, high, persistent fever, common symptoms. Disease may be fulminating and death may take place within 24 to 48 hours. Symptoms usually last from 3 to 6 weeks, occasionally much longer. Recovery depends largely on early diagnosis by lumbar puncture and injection of antimeningococcus serum into the subdural space; with the serum treatment mortality has decreased from 70 to from 15 to 25 per cent.	Isolate patient until cultures are negative several times; search for and isolate carriers, especially during epidemic. Prevent overcrowding, especially during epidemic.
Anterior poliomyelitis (infantile paralysis).	Minute filtrable microorganism which is very difficult to grow artificially	Epidemic as a rule during warm season from June to October in temperate climates. Isolated cases throughout year.	80 per cent of cases occur in first four years of life. May occur at any age.	Contact with secretions of nose, throat, intestines of persons ill with the disease and healthy carriers either directly, through coughing and sneezing, or through articles contaminated with infected secretions. Possibly transmit-	Not definitely known. Safe period of quarantine probably 6 weeks.	From 2 days to 2 weeks; usually 6 to 8 days.	Onset usually indefinite. There may be fever, vomiting, slight diarrhea, or constipation, fretfulness or drowsiness, prostration, headache, muscular tremor, spinal pain, and general hyperesthesia. Muscular weakness and paralysis of one or more extremities may appear at onset, but usually not until third or fourth day of disease. There may	Strict isolation of cases for 6 to 8 weeks, with disinfection of nose, throat, and fecal discharges. Quarantine of exposed children and adults who deal with children for 14 days from date of exposure. Quarantine of children in same family until 2 weeks after termination of case by death, removal, or recovery

TABLE XXI.—*Important facts concerning so-called "children's diseases"*—Continued.

Disease.	Cause.	Prevalence.	Susceptibility.	Mode of infection.	Period of infectivity of patient.	Incubation period.	Salient features.	Measures of control.
				ted mechanically by insects.			be weakness without any real paralysis or the paralysis may be transitory or unobserved. Usually after 3 or 4 weeks, which should be spent in absolute rest in bed, tenderness disappears and spontaneous improvement begins. After subsidence of acute stage—usually 6 weeks—"reconstructive" treatment for paralyzed muscles should be begun under direction of a trained orthopedist and should be persisted in for at least 2 years. It is important to realize that a large percentage of cases are atypical and would not be recognized as poliomyelitis except during epidemics. Mortality during acute stage varies between 5 and 20 per cent in different epidemics. Permanent paralysis of some degree persists in approximately 50 per cent of recoveries.	Carrier problem at present a very difficult one. To cultivate the organism as a means of detection of carriers is highly impracticable.
Measles (rubeola).	Unknown.....	Winter and spring.	Almost universal. Except in children under 6 months practically all exposed contract the disease. One attack generally confers immunity.	Highly contagious, usually by contact with secretions of mucous membrane of mouth and nose of persons with the disease. Exceptionally through a third person or in-	During period of discharge from the nasal and oral mucous membranes (usually not longer than two and a half weeks), most marked during the preeruptive or ca-	7 to 22 days; usually 14 days.	Onset with 3 or 4 days of premonitary symptoms, with drowsiness and signs of cold in head, running nose and eyes predominating. During this period eruption appears first on inside of cheeks and lips as small bluish-white spots, "Koplik spots." Rash	Isolate patient during period of communicability. Children exposed to infection should be kept from school and public gatherings 14 days. Isolate exposed children showing rise in temperature. Disinfect articles soiled

				fected articles.	tarrhal stage before appearance of rash.		on skin begins on third or fourth day, with small red spots on face; spreads over body, lasting 4 to 6 days; fever high, "staircase" temperature usually for week or more. Rash on fading leaves a fine bran-like desquamation. Otitis most frequent complication. Bronchopneumonia a frequently fatal complication in young children. Frequently a latent tuberculosis develops. Treatment should be directed largely toward measures for prevention of pneumonia.	with secretions of nose and throat. Early recognition and isolation of the disease in the catarrhal stage is often possible by examination of mouth for "Koplik spots." It is particularly important to avoid as far as possible the exposure of children under 6 years, as 90 per cent of deaths from measles occur during this period.
German measles (rubeola).	.....do..	.....do.....	Except under 6 months all ages susceptible.	Probably only by direct contact with the oral, possibly nasal secretions (not highly contagious).	8 days from onset.	10 to 21 days; usually 14 days.	Symptoms of invasion usually absent, or very mild; begins as a rule with a well-marked rash, which spreads from face to body; lasts 3 days; enlargement of postcervical glands one of most constant features. Few diseases are so mild or free from danger. Important to differentiate it from measles and scarlet fever.	Isolate patient 8 to 10 days. Exposed children should be kept from school and public gatherings 3 weeks.
Scarlet fever (scarlatina).	Unknown; practically always associated with streptococcus.	Fall and winter	Not universal; approximately not more than half of children exposed take disease. Susceptibility slight in early infancy, increases to fifth year, then diminishes markedly.	Contact with discharges specially from nose, throat, ears, or broken down glands of persons ill with disease; and often mild unrecognized cases, and carriers, directly, through a droplet infection and through articles soiled by infectious discharges, such as carpets, furniture, toys,	Until discharge from mucous membranes of nose and throat, ears, and glands have ceased; in simple cases may usually be placed at 5 weeks; may be longer than 11 weeks.	2 to 21 days; usually 3 to 4 days.	Onset usually abrupt with vomiting, fever, marked congestion and soreness of the throat. Rash appears usually within 24 hours, first on the neck, spreading rapidly over entire body; fades by eighth day. Marked pealing of skin which lasts from 4 to 8 weeks. Chief complications are otitis, adenitis, membranous inflammations of the pharnyx, which frequently extend to the nose, and nephritis. Many cases are mild and	Isolate case 5 or 6 weeks or until all discharges have ceased. Disinfect all discharges. Quarantine contacts 5 days. Food and milk handlers should not be allowed to follow their occupation if they live in a house in which a person is ill with scarlet fever.

TABLE XXI.—*Important facts concerning so-called "children's diseases"*—Continued.

Disease.	Cause.	Prevalence.	Susceptibility.	Mode of infection.	Period of infectivity of patient.	Incubation period.	Salient features.	Measures of control.
				and clothing. Transmitted also by infected milk.			atypical. Nephritis may follow the mild and unrecognized cases as well as the severe ones.	
Smallpox (variola).	Unknown.....	Spring and fall, and epidemics.	Universal, unless protected by vaccination or previous attack.	Highly contagious. Contact with lesions of skin and secretions from mouth and nose directly; by droplet infection, and through articles which have come in contact with patient. May be transmitted by flies and insects mechanically.	From initial symptoms to disappearance of crusts, scabs, and desquamation from skin.	9 to 15 days; usually 12 to 14 days.	Sudden onset with high fever, vomiting, intense pain in head, back, and limbs. True rash appears on third or fourth day and goes through stage of papule vesile, pustule, scab; begins on face and extremities, slight on trunk. Hard and shotty in character; does not come out in crops. Convalescence slow; complications frequent.	General vaccination in infancy. Revaccination at school entry or during even mild epidemics. Hospital isolation in screened wards. Disinfection of all discharges. Quarantine of all contacts 14 days, or until protected by vaccination.
Chicken pox (varicella).	.....do.....	Spring and fall and epidemics.	No age exempt; unless immunity has been acquired by a previous attack of the disease.	Contact with lesions of skin and mucous membranes directly, or through articles soiled with discharges from lesions; readily communicable, resembling measles.	Until disappearance of scabs from skin, usually 2 weeks.	14 to 21 days..	Slight fever and general constitutional symptoms; eruption generally follows within 24 hours: appears at first on face or trunk as small red papules and spreads over trunk. Papules "come out in crops," develop into vesicles, which then dry up, forming scabs or crusts. Disease usually very mild. Erysipelas rare complication.	Isolation and disinfection at the bedside.
Mumps (epidemic parotitis).	Uncertain; claimed by some to be due to a filterable virus, by others to a diplococcus.	At any season and epidemics.	Only a small number of those exposed contract disease; greatest susceptibility between 4 and 14 years.	Contact with secretions of mouth, either directly or indirectly through articles freshly soiled with infected secretions.	From beginning of symptoms; duration uncertain; undoubtedly communicable for few days after swelling has subsided.	3 to 25 days, usually 14 days.	Onset with pain and swelling of parotid glands on one or both sides, just below and behind the ear; pain on opening mouth, chewing, or swallowing; occasional constitutional symptoms as vomiting, fever,	Isolate patient until 1 week after swelling has subsided. Quarantine exposed children at least 14 days, preferably 3 weeks.

							pain in head or extremities; symptoms and swelling rarely longer than a week. other salivary glands involved at times. In adolescence inflammation of the sex glands not an uncommon complication. Nervous complications rarely occur.	
Whooping cough (pertussis).	Bordet - Gengou bacillus.	Epidemics, winter and spring; endemic in all large cities.	Greatest between 6 months and 5 years. Unlike most of the acute infections, infants under 6 months are susceptible.	Contact with secretions from respiratory tract, mouth, nose, vomitus, of persons ill with the disease directly, by droplet infection, or through articles recently contaminated with infectious secretions. Possibly also through domestic animals. (Whooping cough has been known to occur in domestic animals.)	From the beginning of catarrhal stage until subsidence of spasmodic cough, at least 6 weeks.	7 to 14 days....	Onset with a catarrhal cold or cough without fever. May last 3 or 4 weeks before reaching spasmodic stage, when paroxysm of coughing ends with a whoop and often causes vomiting. This stage lasts about 4 weeks and gradually declines. Marked tendency to convulsions. Pneumonia a common and often fatal complication in young children; treatment should be directed with special emphasis to avoiding this by providing abundance of fresh air and extreme cleanliness. Vaccine treatment seems to shorten the course of the disease. As in measles, a latent tuberculosis often develops.	Isolate patient for at least 6 weeks or until spasmodic stage is past; disinfect discharges. Vaccines as prophylactic for children who have been exposed seem to be of value. As in measles, particularly important to prevent the exposure of children under 5 years, and especially under 2 years; approximately 95 per cent of mortality from whooping cough is in first 5 years; 80 per cent in first 2 years.
Diphtheria.....	Bacillus diphtheria. (In its growth the organism produces a toxin which is soluble in body fluids and absorbed into lymphatic and blood	Never completely absent in any large community. Epidemic outbursts occur at intervals. Maximum prevalence in autumn; a "cold	Greatest between 6 months and 4 years; decreases after 4 years; 85 to 90 per cent of adult population immune. Immunity depends on presence of antitoxin in circulating blood and may be deter-	Contact with discharges from throat and nose of persons ill with disease or healthy carriers, directly through droplet infection or articles of clothing; may be transmitted also by milk.	Until organisms disappear from nose and throat; healthy carriers may be infectious for long periods of time.	2 to 7 days; most often 2 days.	Symptoms of diphtheria are local, depending on development of membrane in nose, throat, or larnyx, and generally dependent on the poisonous effect of diphtheria toxin which causes degenerative changes in the cells of body. Pharyngeal diphtheria or ordinary diphtheritic sore throat, the common	Isolate case until at least 2 negative cultures are obtained from nose and throat. Well children of a household should be excluded from school for one week from date of last exposure; all exposed children should have Schick test, and those giving a positive reaction

TABLE XXI.—*Important facts concerning so-called "children's diseases"*—Continued.

Disease.	Cause.	Prevalence.	Susceptibility.	Mode of infection.	Period of infectivity of patient.	Incubation period.	Salient features.	Measures of control.
	streams and carried to all parts of the body. The injection of this toxin into animals in proper dosage and at proper intervals causes production by animal body of "antitoxin," which has property of combining with the toxin and thus preventing its poisonous action.)	weather" disease.	mined by means of "Schick" test; an inflammation surrounding the injection into the skin of a small amount of diphtheria toxin indicates susceptibility; absence of an inflammatory reaction indicates the presence of antitoxin in the circulating blood and, therefore, an immunity to diphtheria.				form. Onset with fever, chilliness, pains in muscles of throat, back, and limbs; throat becomes red early with difficulty in swallowing; grayish membrane usually appears on tonsils and may spread to uvula, soft palate, and sides and posterior wall of pharynx. Membrane may be absent; may extend to larnyx or nose; may be present in nose or larynx without involvement of throat. Glands of neck usually swollen. If antitoxin is given early and in sufficient doses, symptoms rapidly improve; absolute rest in bed for 3 or 4 weeks is necessary to avoid effect of toxemia which is specially likely to weaken the heart; 40 per cent of cases untreated with antitoxin become rapidly worse with extension of membrane even to larynx; toxemia becomes very severe and death occurs from laryngeal stenosis or paralysis of respiratory muscles or heart failure. In addition to general symptoms, with involvement of larynx, mechanical obstacle to breathing is superposed. In addition to large	should receive prophylactic njections of diphtheria antitoxin. It has recently been discovered that a mixture of toxin and antitoxin injected in suitable quantity and at suitable intervals will produce a prolonged immunity. All children below 12 and if possible below 13 months of age should be immunized irrespective of Schick test (experience has shown that a negative test in infants in majority of cases becomes positive between 6 and 18 months of age). All children over 18 months, youths, and adults with a positive reaction to Schick test should be immunized (experience has shown that antitoxin present after 18 months is usually permanent). The problem of controlling diphtheria carriers is one for the local health board. They will cease to be a problem and diphtheria as a disease should disappear

								doses of antitoxin given intravenously, necessity often of intubation, by which larynx is held patent, or tracheotomy by which air can enter lungs through opening from trachea through neck. Rarely cases of laryngeal diphtheria are primary. They are usually, however, secondary to untreated or insufficiently treated pharyngeal diphtheria. The earlier the use of antitoxin in any given case, the better the result and the greater the chance of recovery.
								with a perfection and universal application of toxin-antitoxin immunization.

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II. ACUTE INFECTIONS OF THE RESPIRATORY TRACT.

These infections are at present the cause of a very high mortality in childhood. There were 12,870 deaths from pneumonia under 10 years of age, and 6,121 under 1 year of age in the registration area in 1919.

A. These include:

1. The common cold.
2. Laryngitis.
3. Bronchitis.
4. Pneumonia.

(All the diseases with portals of entry in the respiratory tract, such as measles, whooping cough, etc., are in a sense respiratory infection.

B. Cause:

1. They are always infectious in origin. A variety of microorganisms have been incriminated, the most important being the pneumococcus, influenza bacillus, streptococcus, staphylococcus, and a filterable virus.
2. The predisposing causes are of the greatest importance, as many of the microorganisms which have been identified as possible causative agents are normal inhabitants of the nose, throat, and mouth, and produce the disease when individual resistance is lowered.

B. Cause—Continued.

2. The predisposing causes, etc.—Continued.

(*a*) Adenoids.

These are caused by and are a cause of respiratory infections. (See Section III, Outline 2, Topic II, C.)

(*b*) Infected tonsils. (See Section III, Outline 2, Topic II, E, 2.)

(*c*) Acute specific fevers, notably measles, whooping cough, and influenza. (See Table XXI.)

(*d*) Rickets. (See Section II, Outline 4, Topic IX, A.)

(*e*) Malnutrition. (See Section II, Outline 6, Topic VIII.)

(*f*) Unhygienic conditions: Overcrowding, insufficient food, fatigue, lack of fresh air and sunshine, and exposure to wet and cold. (See Section III, Outline 7, Topic IV.)

C. Outstanding symptoms and principles of treatment.

1. Common cold. (See Section III, Outline 2, Topic II, B.)

2. Laryngitis is characteristically associated in infants and young children with spasm of the larynx which causes the chief symptoms.

(*a*) Catarrhal spasm of the larynx or catarrhal croup is not uncommon in young children.

(1) Symptoms.

(*a*) Sudden onset of difficult breathing at night.

(*b*) No symptoms during day except slight hoarseness.

(2) Treatment.

It is directed toward the relaxation of the laryngeal spasm.

(*a*) Steam inhalations.

(*b*) Use of an emetic, preferably ipecac.

(*c*) Hot fomentations, or cold compresses over larnyx.

(*b*) Acute catarrhal laryngitis is more severe than catarrhal spasm of the larynx. It must be distinguished from membranous laryngitis due to the diphtheria bacillus.

(1) Symptoms.

(*a*) Hoarseness.

(*b*) Hacking cough.

C. Outstanding symptoms and principles of treatment—Continued.
2. Laryngitis, etc.—Continued.
(*b*) Acute catarrhal laryngitis, etc.—Continued.
(1) Symptoms—Continued.
(*c*) High fever.
(*d*) Prostration.
(*e*) Difficult breathing at night.
(2) Treatment.
(*a*) Rest in bed and general care, as for all acute infections.
(*b*) Steam inhalations.
(*c*) Occasionally operative interference, if breathing is seriously interfered with.

3. Acute bronchitis may be primary, as an extension of inflammation from above, or secondary to measles, influenza, pertussis, scarlet fever, diphtheria, pneumonia, pleurisy, or other infectious disease. It may be mild or severe.
(1) Symptoms.
They vary with severity of process. (Very severe symptoms usually indicate involvement of lungs in bronchopneumonia.)
(*a*) Cough.
(*b*) Fever.
(*c*) Increased respirations.
(*d*) Constitutional symptoms of infection.
(2) Treatment.
(*a*) Rest in bed and general care.
(*b*) Steam inhalations.
(*c*) Counterirritation, such as mustard pack.
(*d*) Warm but fresh air.
(*e*) Drugs only as indicated.

4. Pneumonia may be primary or secondary as in bronchitis. It is of two types:
(*a*) Lobar pneumonia is practically always due to the pneumococcus, of which there are at present four known groups, and is characterized by involvement of the whole lobe of a lung. It is usually primary, and though a very fatal disease in adult life, it is often milder in children.

C. Outstanding symptoms and principles of treatment—Continued.

4. Pneumonia may be primary or secondary as in bronchitis. It is of two types—Continued.

(*a*) Lobar pneumonia, etc.—Continued.

(1) Symptoms:

(*a*) Sudden fever.

(*b*) Pleural pain.

(*c*) Rapid breathing.

(*d*) General symptoms of infection.

(Fever usually terminates between the fifth and eighth day though it may last only one day. Empyema or pus in pleural cavity is not an infrequent sequela.)

(2) Treatment:

(*a*) General care with abundance of fresh air.

(*b*) Drugs as indicated, for stimulation or pleural pain.

(*c*) Group I. antipneumococcus serum, when Group I, pneumococcus is the causative organism.

(*b*) Broncho-pneumonia is usually caused by several microorganisms. Scattered areas over the lungs are involved and the inflammatory process is essentially destructive. It is the chief form of pneumonia, both primary and secondary, in infants, and is very fatal. The course is generally prolonged and death is frequent.

(1) Symptoms:

Those of primary broncho-pneumonia are not unlike those of lobar pneumonia; while those of secondary broncho-pneumonia are variable.

(*a*) High temperature.

(*b*) Hacking cough.

(*c*) Rapid respiration.

(*d*) Cyanosis.

(*e*) Prostration.

C. Outstanding symptoms and principles of treatment—Continued.
4. Pneumonia may be primary or secondary as in bronchitis. It is of two types—Continued.
(*b*) Broncho-pneumonia, etc.—Continued.
(2) Treatment:
(*a*) Prolonged rest in bed and general care.
(*b*) Steam inhalations.
(*c*) Special drugs, as indicated.

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III. TUBERCULOSIS.

A. Prevalence of tuberculosis in childhood.
1. Tuberculosis causes a large number of deaths in young children.
(*a*) Statistics for the registration area show that there were 4,685 deaths from this cause under 3 years of age in 1919. (This does not include all the deaths from tuberculosis in this age period, for in infancy tuberculosis frequently goes undiagnosed, and death from tuberculosis is often attributed to other causes.)
(*b*) Analysis of statistics in Greater New York for five years indicates that probably deaths from tuberculosis in no one year exceed those of the first year of life. (See Hess, p. 83.)
2. It causes much of the malnutrition in older children, also chronic adenitis, bone and joint disease, and a number of other ill-defined ailments in childhood.
3. The active pulmonary tuberculosis so common in adult life is a disease probably developing from an infection acquired in early childhood.

B. Cause and nature of tuberculosis in childhood.
1. Tuberculosis is caused by the tubercle bacillus. There are two varieties which can produce the disease in man.
(*a*) Human (this is the cause of the greater number of cases).
(*b*) Bovine.
2. Infections with the tubercle bacillus does not necessarily mean the production of tuberculous disease.

B. Cause and nature of tuberculosis in childhood—Continued.

2. Infections, etc.—Continued.

(*a*) Studies by means of the von Pirquet skin test, one of the best ways by which infection with the tubercle bacillus can be ascertained, indicate that by the twelfth year more than 90 per cent of the city population have been infected.

(*b*) Tuberculosis develops when the human body is in a condition favorable for the growth of the organism and the absorption of its toxins. Such conditions are furnished by—

(1) Infancy and early childhood. (Infection at this period is likely to produce acute generalized tuberculosis or tuberculosis meningitis, or acute destructive pulmonary tuberculosis, all of which are fatal.)

(2) Repeated exposure. (Any resistance will break down under repeated bombardment.)

(3) Social and economic conditions: Fatigue, poverty with its attendant hardships, overcrowding, underfeeding, etc.

(4) Certain of the acute infections, notably measles, whooping cough, repeated colds, bronchitis.

(5) Physical defects, particularly the long, narrow chest, and the chest deformed by rickets. In the latter the lung space is greatly reduced.

3. Transmission. (See Section III, Outline 3, Topic III.)

(*a*) Contact with cases of open pulmonary tuberculosis.

(1) Direct: Notably when a tuberculous mother cares for a child.

(2) Indirect—through dust, clothing, etc. Infection of children with the human bacillus is largely due to the fact that for the first six or seven years of its life the average child spends the greater part of each day on the floor, and its soiled hands and toys are frequently in its mouth. In a house where a tuberculous person

B. Cause and nature of tuberculosis in childhood—Continued

3. Transmission—Continued.

(*a*) Contact with cases of open pulmonary tuberculosis—Continued.

(2) Indirect, etc.—Continued.

resides, the floor becomes infected readily by coughing and careless expectoration. Infection may even be carried by shoes. The tubercle bacillus lives for long periods in a dark, damp place.

(*b*) Through milk.

(1) Bovine tubercle bacillus in the milk of tuberculous cows is a cause of approximately 20 per cent of the cases in children in the United States, and of a much larger per cent in England and Scotland, where raw milk is commonly used. (See Austin, p. 264.)

(2) Human bacillus transmitted by milk contaminated in handling.

C. Manifestations of tuberculosis in childhood.

1. The younger the child having tuberculosis the more likely it is that the disease will be acute and fulminating.
2. Even in young children, its only manifestation may be a slight fever and failure to thrive properly.
3. It frequently develops after measles or whooping cough, when failure to convalesce satisfactorily frequently occurs, with prolongation of fever and development of signs in the lungs, glands, bones, or joints.
4. What is thought to be broncho-pneumonia secondary to whooping cough or measles is frequently tuberculosis.
5. In older children, the disease is usually mild; it tends to be chronic and often vague. The common manifestations are tuberculosis of glands, bones, or joints; at times of peritoneum; not infrequently its only symptoms are malnutrition, anemia, or irregular fever.

D. Treatment of tuberculosis in children.

It is largely hygienic and prophylactic, but may call for surgical treatment in bone and joint and glandular cases.

1. Infants should be protected as follows:

(*a*) A mother with active tuberculosis should not nurse, care for, or be closely associated with her infant. (Infant preventoria for such cases seem the best way of approaching such a problem.)

D. Treatment of tuberculosis in children—Continued.

1. Infants should be protected as follows—Continued.
   (*b*) Nurses should be carefully examined before being allowed to care for children.
   (*c*) Milk which is fed to children should come from cows shown to be free from tuberculosis by the tuberculin test, otherwise it should be pasteurized or scalded. (See Section II, Outline 3, Topic IX.)
2. Older children should be protected by building up and maintaining resistance. Preventive measures are as follows:
   (*a*) Plenty of fresh air and sunshine. (Open-air schools and farms are advocated for children with positive von Pirquet reactions, for those who show malnutrition, anemia, irregular fever, etc.)
   (*b*) Protection, especially of children who have been exposed to tuberculosis from measles, whooping cough, and respiratory infections. (If they contract these infections, the period of convalescence should be prolonged.)
   (*c*) Removal of all local predisposing elements, such as infected tonsils and adenoids.

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IV. INFECTIONS OF THE GASTROINTESTINAL TRACT.

The infections of the gastrointestinal tract are with few exceptions transmitted through contaminated water, infected food, including milk, or soil containing fecal discharges. Their existence, therefore, is largely an index of the sanitary condition of a community. Prevention consists in sanitation and in boiling of food and water, if it is not definitely known to be pure.

A. Dysentery (bacillary).

1. This is an infectious disease characterized by diarrhea, with blood and mucus of varying amount in the stools.
2. The infectious agent, the dysentery bacillus, gains entrance to the body through the mouth, usually through the drinking of contaminated milk or water.
3. Preventive measures are important.
4. Treatment is general, with modification of the diet as for the other diarrheas, and local treatment under a physician's directions, as indicated.

B. "Worms."

1. The common varieties causing disease in children are:
   - (*a*) Beef tapeworm.
   - (*b*) Dwarf tapeworm.
   - (*c*) Roundworm.
   - (*d*) Pinworm.
   - (*e*) Hookworm.
2. These parasites, except hookworm, enter the body through the mouth; the hookworm enters through an infection of the skin by contaminated soil, and eventually reaches and is discharged from the intestines.
3. The symptoms are often indefinite, hookworm, in particular, is notable as a cause of marked anemia, malnutrition, and arrested growth. The diagnosis is made by finding the worms, or their ova, in the stools.
4. Treatment consists in the use of a vermifuge under a physician's directions.
5. Preventive measures.
   - (*a*) Sanitation.
   - (*b*) Thorough cooking of meat.

     Beef tapeworm is contracted by eating raw or insufficiently cooked beef in which larvæ exist. These develop into worms in the intestines.
   - (*c*) Personal cleanliness.

     This is particularly important in an infection like pin worm, in which the child is likely to reinfect himself repeatedly.

C. Other infections of the gastrointestinal tract are typhoid fever and cholera, but these are not common in childhood.

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V. VENEREAL DISEASES.

Gonorrhea and syphilis in parents frequently leave their mark on the child.

A. Syphilis in children before puberty is nearly always congenital, that is, acquired by the child during intra-uterine life.

1. It manifests itself:
   - (*a*) In stillbirths, or in death at term. (It is estimated that in a syphilitic family 30 per cent of the pregnancies terminate in death at or before term, a waste three times greater than found in nonsyphilitic families.) (See Jeans.)
   - (*b*) In death during infancy.
     - (1) Thirty per cent of all living births in a syphilitic family die in infancy as compared to a rate of 15 per cent found in nonsyphilitic families.
     - (2) Death in a syphilitic baby may be the result of:
       - (*a*) Syphilitic infection.
       - (*b*) Progressive malnutrition, a frequent accompaniment of syphilis in infancy.
       - (*c*) Accidental intercurrent disease, due to lowered resistance brought about by the presence of syphilis.
   - (*c*) In syphilitic disease, which may manifest itself in infancy or remain dormant until childhood or later.
2. Important facts as to the control of congenital syphilis:
   - (*a*) It would not exist if parents were adequately treated before marriage, or if the mother were given treatment as early during pregnancy as possible.

A. Syphilis in children before puberty, etc.—Continued.
   2. Important facts, etc.—Continued.
      (*b*) A child with syphilitic parents, treated or untreated, should be carefully watched for any suspicion of syphilis, and should have blood tests made at frequent intervals, so that treatment can be instituted immediately.
      (*c*) A syphilitic infant needs breast milk even more than a nonsyphilitic one; if that is impossible, most careful artificial feeding and protection against intercurrent infection should be given.
   3. Acquired syphilis in childhood, usually the result of infection through contaminated towels or drinking cups, is rare.

B. Gonorrhea affects babies and young children in two ways:
   1. Ophthalmia neonatorum is an infection of the eyes received during the passage of the child through the birth canal.
   2. Gonorrheal vaginitis, which affects girls from infancy on, is acquired from the mother during passage through the birth canal, but is most frequently acquired from infected toilet seats, towels, diapers, etc., or bad sex habits.
      (*a*) It is characterized by a purulent discharge from the vagina, which is highly contagious.
      (*b*) Treatment consists of scrupulous cleanliness, irrigation of the vagina with mild antiseptic douches, and local treatment by a physician. Vaccines are possibly of some value.

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VI. INFECTIOUS DISEASES OF THE SKIN.

A. Impetigo contagiosa.
   1. It is thought to be caused by staphylococcus and is characterized by the formation of vesicles which develop into vesiculo-pustules, occurring chiefly on the hands and face.

A. Impetigo contagiosa—Continued.
   2. It is readily communicable and spread by auto-inoculation from one part of the body to the other.
   3. Treatment consists in the use of ammoniated mercury ointment, which is very effective.

B. Itch, or scabies.
   1. It is due to the burrowing into the skin of the female acarus, or itch-mite, with secondary lesions which result from scratching.
   2. Treatment consists in thorough washing, the use of a parasiticide, such as sulphur ointment, and care to prevent reinfection by boiling, or baking clothing and bedding.

C. Ringworm of the scalp.
   1. It is characterized by the presence of scaly patches with loss of hair.
   2. Treatment consists in cutting short the hair over and surrounding the patch and applying a parasiticide, with frequent thorough washing of the whole scalp.

D. Head lice, or pediculosis capitis.
   1. It is an infection of the hair with "pediculi" or "head lice," which characteristically form "nits."
   2. Treatment consists in thoroughly soaking the hair with crude petroleum and shampooing with vinegar.

E. Body lice, or pediculosis corporis.
   1. It is an infection of the body with "pediculi" or body lice.
   2. Treatment consists in bathing, and boiling the clothes.

READING REFERENCE VI.

Holt *and* Howland, cited above, pp. 932–933; 935–938.

OUTLINE 5. RURAL HEALTH PROBLEMS.

Over half the children in the United States live in the country. The welfare of the Nation is directly bound up in the farming industry, which furnishes the food supply, as well as the raw material for much of the clothing. The health of the Nation is, therefore, dependent in part on the hygienic conditions existing there. Until fairly recently the whole question of rural living was regarded uncritically; the only factors considered necessary for health were fresh air, sunshine, and plenty of room, all of which were to be found in the country. Now the importance of other hygienic and social conditions is appreciated, the lack of which may nullify the natural health advantages of the country. It rests largely with the indi-

vidual to make conditions in the country healthful for the growing child. Where neighbors are far distant community action can not develop and the feeling of individual responsibility may not be aroused. Rural isolation also tends to check the spread of knowledge concerning healthful living.

I. RURAL DISTRICTS IN THE UNITED STATES.

A. The United States Census defines as urban the population residing in cities and other incorporated places of 2,500 inhabitants or more. Our rural population will then be found in—

1. Small towns.
2. Villages.
3. Hamlet or "four-corner" settlements.
4. Isolated farms, homesteads, cabins or shacks.

B. Statistics show:

1. Nearly one-half (48.6 per cent in 1920) of the population of the United States is in rural territory and a very large proportion of the rural population is living in the open country. (For proportion of rural population living in open country in 1910, see Atlas of American Agriculture, pp. 3–6.) The increase in the total population living in rural areas from 1900 to 1910 was only one-third that of the population living in urban territory. In six States—New Hampshire, Vermont, Ohio, Indiana, Iowa, and Missouri—there was an actual decrease in rural population during the same period. In the decade 1910–1920 the rural population decreased in 18 States, including, in addition to the six just enumerated, the following: Delaware, Illinois, Kansas, Maine, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New York, Rhode Island, and Tennessee. In the country as a whole the urban population increased 12,143,651, and the rural population 11,594,703.
2. The greater percentage of the child population lives in rural communities; according to the 1910 census over 60 per cent of the children under 15 years of age are in rural communities.
3. Birth mortality, or the death rate the first month of life, is greater in rural districts, though infant mortality under 1 year of age is apparently greater in cities over 10,000 population than in the rural parts of the registration States. (See Birth Statistics, 1919.)

B. Statistics show—Continued.

4. The examination of rural school children has apparently disclosed the prevalence of worse health conditions than among city school children. (See Topic III, H, 2, c.)
5. A considerable physical advantage on the side of the country boy was, on the other hand, disclosed by the draft. (See Provost Marshal General. Second Report, p. 159.) Country boys made, on the whole, better records than city boys; white registrants than colored; native born than those of alien birth. In general, the States which are largely agricultural showed fewer rejections than those States which are largely industrial. (See Ayers, pp. 20–21.)
6. Illiteracy has been found to be very much larger in country than in city areas. According to the 1910 census the number of illiterates was 10.1 per cent of the total population of rural communities or almost twice the percentage of illiteracy (5.1 per cent) found in urban communities. Although nearly half of the illiterates in rural areas are Negroes, the proportion of illiterate native whites of native parentage is much higher in rural (5.4 per cent) than among urban dwellers (0.9 per cent). (See Atlas of American Agriculture, pp. 10–11.)
7. The proportion of children of 10 to 14 years of age not attending school was considerably higher in the rural (14.2 per cent) than in the urban districts (8.3 per cent), and this difference appears for every element in the population. (See Atlas of American Agriculture, p. 10.)

C. General conditions of living are affected by:

1. Climate.

   The greatest differences are found in arid versus moist regions, and in the extremely cold, northern settlements as contrasted with the extremely warm regions of the South.
2. Geographical situation such as—
   (*a*) Forest.
   (*b*) Mountains.
   (*c*) Plains.
   (*d*) Sea.
3. Length of period of settlement.

   The best farming communities of the United States can boast of as well-equipped homes, where every de-

C. General conditions of living are affected by—Continued.

3. Length of period of settlement—Continued.

mand of modern hygiene and sanitation are satisfied, as any urban community. Conditions will, however, greatly differ in—

(*a*) The settled farming regions of the Middle West.

(*b*) The run-down farms in certain portions of the country.

(*c*) The pioneer, frontier life from which many of our far Western States are just emerging.

(*d*) Portions of the South, where the economic depression of the Civil War is still felt.

4. Access to centers of population. This depends on—

(*a*) Actual distance.

(*b*) Roads.

(1) Type.

(2) Condition or state of repair.

(*c*) Increased use of automobiles and development of interurban car lines.

5. Industry of the region.

Although the one great industry of our rural districts is agriculture, many other forms are pursued in the country. Home life and healthy social and living conditions differ in communities given over to—

(*a*) Farming.

(*b*) Ranching.

(*c*) Mining.

(*d*) Industrial camps.

(1) Lumber.

(2) Crop harvesters.

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II. MODERN RURAL DEVELOPMENT.

A. Rural life in the United States has gone through several stages of development. These periods correspond fairly closely with the life of a single generation. (See Cubberley, pp. 6–62.)

B. The modern agricultural development of the United States began about 30 years ago. It is characterized by the urbanization of rural life and the development of agriculture on a business basis.

C. Much of the present development of the agricultural industry is due to the conservation and country life policies of President Roosevelt, especially as a result of the Country Life Commission appointed by him in 1908. (See Plunkett, pp. 19–34.)

D. The neglect from which farm problems had suffered and the resulting lowering of national efficiency was strikingly brought out by the report of this commission. Mr. Roosevelt, in his message to Congress presenting the report, stressed better farming, better business, and better living as the important points needing reform in country life. (See report of the Country Life Commission.)

E. The most important outcome of this agitation for rural betterment has been the strengthening of the work of the State and Federal Departments of Agriculture by the passage of the cooperative agricultural extension act of May 8, 1914, the so-called Smith-Lever bill. The funds expended under this act have done much to improve the farming industry and living and social conditions on the farm, as well as the agricultural education of the adult and the country child.

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III. CONDITIONS NOT UNCOMMONLY FOUND IN CERTAIN RURAL COMMUNITIES PREJUDICIAL TO CHILDREN'S HEALTH.

A. Bad housing. (See Section III, Outline 7.)

1. Poor, often flimsy construction, due to either economic reasons or inertia.
2. Insufficient space, causing overcrowding.

A. Bad housing—Continued.
   3. Too few rooms, affecting sleep, morals, etc.
   4. Poor heating.
   5. Lack of ventilation with no outlet for used air (windows are often hermetically sealed all winter).
   6. Neglect of fire dangers and protection.
   7. Poor or no sanitary arrangements.
   8. Few household conveniences.

B. Ignorance of or indifference to proper health habits. The needs generally ignored are:
   1. Food requirements of the growing child.
   2. Ventilated bedrooms.
   3. Number of hours of sleep for children of different ages.
   4. Cleanliness.
   5. Regular daily bowel movement.
   6. Preservation of the teeth.

C. Food.
   1. The choice is limited often to products of the farm, and an unbalanced diet not infrequently results. A kitchen garden and an abundance of fresh vegetables is frequently lacking in country homes. A diet insufficient for growth may result, especially if milk is not available.
   2. The production may be uncleanly. Milk production and the slaughtering of meat is individually handled and not under inspection.
   3. Refrigeration is limited and other means of preservation may be either unknown or unemployed.
   4. Poor preparation of food. There is often ignorance of simple, good methods of cookery.

D. Water supply.
   1. There may be actual dearth of water.
   2. The supply, though sufficient, may be inconvenient.
   3. The water may be polluted by contaminations from privies, barnyards, or manure piles.

E. Insanitary disposal of waste and excretions.
   1. Garbage is sometimes left uncovered and scattered, especially during the winter.
   2. There is a lack of sanitary privies and septic tanks. Human and animal excreta are not infrequently scattered about the premises.
   3. Flies and other vermin are not excluded from garbage piles, cesspools, or privies.
   4. Manure heaps are permitted too near dwellings, and are not properly managed.

F. Pests frequently overrun the premises and conditions favoring the spread of disease go absolutely unchecked.
   1. Pests commonly found are:
      (*a*) Flies.
      (*b*) Mosquitoes.
      (*c*) Rats.
   2. Communicable diseases against which preventive measures are frequently not taken:
      (*a*) Hookworm.
      (*b*) Trachoma.
      (*c*) Tuberculosis.
      (*d*) Malaria.

G. Inaccessibility to medical, nursing, and hospital aid. This results in:
   1. Casualties of childbirth.
   2. Prevalence of undiagnosed diseases, such as hookworm, trachoma, tuberculosis, malaria, etc.
   3. Unnecessary loss of life in case of accidents, fractures, serious hemorrhages, etc.
   4. Severity of epidemics of acute infectious disease, such as diphtheria, if once started.

H. Poor schools. There are said to be to-day 12,000,000 children in the one-teacher rural schools of the United States. (See Broadhurst, p. 352.)
   1. Inadequate building and equipment.
   2. Insanitary conditions.
   3. Poor heating and ventilation.
   4. Lack of fire protection.
   5. Poorly trained, underpaid teachers.
   6. Too few scholars to permit of grading.
   7. Overcrowding for capacity of building and for single teacher.
   8. Education not suited to agricultural needs.
   9. School nurses, school doctors, school clinics almost unknown.

I. Lack of social and recreational opportunities.
   1. Chores are often overtaxing and burdensome to the child. The most extensive and in some ways the worst forms of child labor are met with in the country. (See Section VI, Outline 2, Topic III.)
   2. The need of opportunity for recreation for the rural child is not generally recognized. Play is thought unnecessary. Playgrounds, equipment, leadership may all be wanting.

I. Lack of social and recreational opportunities—Continued.

3. Coarse, unsuitable forms of recreation may prevail; cheap or pernicious moving pictures, dance halls, or pool parlors may creep into the small town, where forms of normal recreation do not exist.

4. During the colder months the people have more time, and recreation has to be adapted to this period. (This difference from city needs is not generally appreciated.)

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IV. RURAL IMPROVEMENTS.

A great deal has been done, both through State and local initiative, to promote better health conditions in rural districts. The Federal Government through surveys and studies of local conditions has shown the need for reforms in many different directions.

The following important questions which bear so directly on the problem of rural life should be studied and all agencies interested in rural betterment should cooperate in a program which will help to raise standards for family and community life.

A. Ideal housing.

1. Selection of location of home in regard to—
   - (*a*) Drainage and sanitation.
   - (*b*) Light adjustment.
   - (*c*) Wind protection or exposure.
   - (*d*) Conveniences to farm buildings, roads, water supply.
   - (*e*) View or outlook.
2. Sound, suitable construction.
3. Plan of indoor space, to include, if possible—
   - (*a*) Adequate number of bedrooms, at least one for father and mother, and children of each sex.
   - (*b*) Sitting room apart from kitchen.
   - (*c*) Kitchen not large enough to cause wasted effort or so small as to endanger overcrowding.
4. Lighting.
   - (*a*) Good sized windows and plenty of them.
   - (*b*) Best artificial light available.
5. Heating.
   - (*a*) Furnace installed in cellar. Hot air furnace cheapest, steam radiators with modulated valves probably offer best heat. Radiators should be placed under windows.
   - (*b*) Stoves, when used in schools or in living rooms, should be jacketed.
   - (*c*) Fire precautions should be taken by protecting stovepipes passing through wooden partitions or roofs and by lining chimneys.
6. Ventilating.
   - (*a*) In building, a vent or outlet for used air has been recommended in each room near the

A. Ideal housing—Continued.

6. Ventilating—Continued.

(*a*) In building, etc.—Continued.

ceiling. This opening should connect with a flue leading to the open air as nearly vertical as possible (an unused chimney flue is excellent for this purpose). The flue opening should have a cover to keep out rain, so raised as not to interfere with the free outflow of air.

(*b*) Windows should be made on two sides of every room, wherever possible, so as to allow of a circulation of air, if no other outlet is furnished. If storm windows have to be used, those in bedrooms should either be hinged so as to open, or at least one whole pane should open.

7. Sanitation. (See Topic III, C and D.)

8. Household conveniences. (See Barrows and Reese.)

Much has been done of late to lighten the demand on the mother and to prevent wasted effort. The installation of the power washing machine is one important way in which the drudgery of the farm woman can be prevented. (Overfatigue of the mother is considered to be largely responsible for the bad social conditions often found in rural life.) (See Galpin, pp. 105–117.)

B. Health habits. (See Section II, Outline 5.)

Better personal habits are started through the school and through the health teaching which may reach the parent through many various channels such as the school, extension work, the visiting nurse, and pamphlets.

1. Food.

(*a*) Children are given regular meals, well selected and well cooked.

(*b*) The farm child is taught to eat what is good for it, especially milk.

(*c*) The hot school lunch is perhaps one of the most valuable of all food reforms.

2. Fresh air.

(*a*) The ventilation of bedrooms is still quite insufficiently practiced in regions with cold climates.

(*b*) Outdoor play and winter sports have been greatly increased.

3. Sleep.

(*a*) Every growing child needs at least 9 hours of sleep; young children need more than this.

B. Health habits—Continued.

3. Sleep—Continued.

(*b*) Parents are learning that boys and girls need more sleep than adults. Rural people usually go to bed early, often with the onset of night. The parents can arise at dawn without harm to themselves; the child can not.

4. Cleanliness.

(*a*) The weekly bath is the minimum requirement for health; a daily tub bath is desirable for most children; especially in the summer time.

(*b*) Bathing without the conveniences of running water and the stationary tub is most difficult.

(*c*) Clothing should be clean, whole, and frequently changed.

5. The daily bowel movement.

(*a*) Where there is no inside toilet, it is difficult to maintain regular habits; the mother is unable to supervise this important health measure.

(*b*) Little children should not be permitted in cold weather to use outside privies, but should use a commode in the house.

6. Teeth.

(*a*) Preservation of the first teeth is now known to be necessary for the integrity of the second set. (See Section III, Outline 2, Topic III.)

(*b*) Regular brushing of the teeth is becoming widespread.

(*c*) Regular visits to the dentist for inspection and repair work is becoming popular.

(*d*) Dental clinics for the schools and for the community are beginning to appear in rural regions.

C. Food.

1. The nutritional needs of the adult and child should be studied, including the selection of wholesome appetizing food, and a balanced diet. (See Section II, Outlines 2, 4, 5, and 6.)

2. The production of milk, the slaughtering and care of meats, and the handling of all foodstuffs, especially perishable foods, should be safeguarded by the use of modern sanitary methods.

3. Home canning, drying, and other methods for the preservation of food should be introduced and improved on.

C. Food—Continued.

4. Methods of cookery which shorten labor and which insure thorough cooking, and improve the digestibility as well as the taste of foods, should be promulgated.
   (*a*) The fireless cooker.
   (*b*) Baking and broiling instead of frying.

D. Water supply.

1. The source should be pure and the possibility of pollution should be prevented.
   (*a*) Wells.
      (1) Location.
         (*a*) If the water is piped, the well should be located 100 yards or more from the dwelling, stable, or privy.
         (*b*) If the water has to be carried by hand, the well should not be located nearer than 200 feet from either stable or privy. The ground should not slope down to the well but away from it.
         (*c*) The well may be located near the house if slops are not emptied on the ground and if the soil above it is kept free from filth. (See Freeman, p. 7.)
      (2) Wells should be deep bored and never shallow. The water should be separated from the surface by an impervious stratum of clay or similar material insuring against the possibility of contamination by surface drainage.
      (3) The curbing and lining may be of brick or stone laid in cement or of concrete.
      (4) The well platform should be watertight.
      (5) An air-tight cover should be provided.
      (6) Wells should be fenced in or the soil protected from contamination. (See Reese, pp. 23–29.)

D. Water supply—Continued.
1. The source should be pure, etc.—Continued.
(*b*) Springs in limestone soil are much more liable to pollution than those occurring in freestone soils because they are more apt to come from surface streams. All springs should be protected by being—
(1) Fenced in.
(2) Curbed.
(3) Covered.
(4) Piped if possible.
(*c*) Rain water cisterns or tanks:
(1) The construction should be sanitary.
(2) The cover should be water-tight.
(3) Filters should be above ground.
2. The purity of the water should be established by sending a sample for examination to the State board of health or State hygienic laboratory.
3. If water, where any possibility of contamination exists, must be used, a good sand filter should be employed or the water should be boiled.
4. Indoor running water is a definite advance that has been made in the last decade in many rural communities.
(*a*) There is no other one thing that so lightens the household labor and promotes the health of all members of the family as running water—
(1) In the kitchen sink.
(2) In the family bathroom.
(*a*) Sanitary flush toilet.
(*b*) Bath tub.
(*b*) Running water may be obtained by the use of—
(1) Gravity system.
(*a*) Natural pressure.
(*b*) From a supply tank filled from eaves, windmill, hand pump, gasoline engine, or electric motor.
(2) Air-pressure system.

E. Disposal of waste and excreta.
1. Garbage should be collected in one place and strongly covered or screened from flies.
2. Manure heaps should be placed as far as possible from house.

E. Disposal of waste and excreta—Continued.

3. If flush toilet can not be installed either connected to sewage system or septic tank, sanitary privies should be constructed. (See Lumsden, Stiles, and Freeman, pp. 12–26.)
4. Cesspools to receive water refuse should be properly located and constructed.

F. Control of pests and infectious diseases.

1. Houses should be completely screened; adjustable half-screens and lack of door screens usually mean flies or mosquitoes in the rooms. Outdoor privies should be carefully screened and properly constructed. (See Topic III, E.)
2. Stagnant water should be drained or small pools should be covered with a film of oil to prevent the breeding of the mosquito.
3. Prevention of the pollution of the soil or water supply is one great means of combating the existence of such diseases as hookworm and typhoid fever.
4. All forms of vermin should be exterminated.

G. Health work.

1. Health propaganda on the principles of hygienic living and the prevention of the spread of infectious disease must be widespread. This may be done through—
   (*a*) Instruction of mothers through visiting public health nurse, in regard to the proper care of themselves and their children.
      (1) A nurse for rural work is now mandatory in every county in Wisconsin and in North Dakota.
      (2) The American National Red Cross has more than 1,000 nurses largely in rural districts helping to build up the county staff.
   (*b*) Health work in the schools.
   (*c*) General health work of United States Public Health Service, State boards of health, and extension divisions of State universities and colleges of agriculture.
   (*d*) Antituberculosis work. (See publications of National Tuberculosis Association.)
2. The State laws regarding the quarantine and isolation of infectious disease must be enforced in rural districts.

G. Health work—Continued.
   3. Health centers must be established with the help of the public health nurse in all rural areas for—
      (*a*) Prenatal instruction and supervision of pregnancy.
      (*b*) Instruction and supervision of nursing mother and infant.
      (*c*) Health supervision of the preschool child.
      (*d*) Health supervision of the older child.
   4. Hospitals on the county system should be developed where no hospitals exist, or existing hospitals so situated as to care for large surrounding rural areas should be developed so that good medical, surgical, and obstetrical care may be furnished locally. State hospitals should also be maintained for surgical and medical treatment and for special treatment.
   5. Clinics for dentistry, eye, ear, nose, and throat work, the treatment of malnutrition and venereal diseases should be established.
   6. Medical and nursing service and home helps should be available for the care of sickness in the home. (See Section III, Outline 7, Topic III, C.)

H. Improvement of schools.
   1. Importance. The improvement in rural schools has had a direct effect on forming and raising the ideals and standards of the rural home.
   2. The one-room or small-scale school.
      (*a*) The "little red schoolhouse" filled the needs of pioneer communities and was a strong socializing force in early days.
      (*b*) This system is rapidly going, and can no longer furnish the education needed for present-day life.
         (1) The buildings represent the worst type of building in the country from the standpoint of health and general fitness.
         (2) The equipment for teaching and for play is insufficient and inadequate.
         (3) The educational and vocational demands are too great for a single teacher.
         (4) Adequate supervision of such schools, or school medical inspection is practically impossible.

H. Improvement of schools—Continued.

2. The one-room or small-scale school—Continued.

(*c*) The results of the one-room school:

(1) Shortened months and years of schooling for rural children.

(2) Undue number of retarded school children (rural illiteracy, in 1910, was twice as large as urban). (See Topic I, B, 6.)

(3) Less opportunity for the detection and correction of children suffering from remediable defects such as bad teeth, eye disease, bad hearing, malnutrition, etc., in rural schools than in city schools. (See Wood, Health Essentials for Rural School Children.)

(4) Keeping diseased and mentally defective children with normal healthy children.

(5) Inability of single teacher to do much rural extension work.

3. Consolidated or large-scale elementary school.

(*a*) Such schools drawing from a 25-square mile area instead of a 5-square mile area are supported by a larger number of taxpayers, and can be maintained with greater economy and efficiency.

(*b*) Better salaries for teachers are possible, and better training of teachers fitted to rural needs can be required. (See Arp.)

(*c*) Necessary teaching equipment can be afforded.

(*d*) Scholars can be graded.

(*e*) Age groups are sufficient for group games and play.

(*f*) Playgrounds, equipment and recreational supervision can be provided.

4. Rural high schools. Opportunities for rural children to have secondary education while living at home should be made possible for—

(*a*) It tends to socialize the home. Child brings back modern ideas to parents.

(*b*) The child is protected by home environment, and not subjected to dangers of town life while boarding out at an impressionable age.

H. Improvement of schools—Continued.

4. Rural high schools—Continued.

(*c*) Rural high school should offer the boys and girls both general education and vocational training for life and work on the farm and in the home. (See Arp, p. 101.)

5. Evening schools for older girls and boys and men and women who have left school and who are employed in the home or on the farm.

6. Rural school extension work.

(*a*) Volunteer continuation schools, such as Iowa "township special" schools.

(*b*) Short courses in agriculture in secondary schools.

(*c*) Club work for boys and girls. (See Benson and Warren.) This important movement has had far-reaching economic and social results.

(1) Farming is improved.

(2) Education is enlarged.

(3) Children have pleasure of social club life.

I. Socialization of the rural districts.

The changes in the social ideals and achievement of the rural home and community have followed similar improvements in urban life of recent years. The better economic conditions and the improvement of living on the farm have made these reforms possible. The development of rural recreation has been a principal feature of this work.

1. The chief ways in which social rural backwardness has been attacked has been through—

(*a*) Schools.

(1) Better educational advantages, and especially an education adapted to training the child for farm life has reacted indirectly on improving home and community standards.

(2) Meetings held at the schoolhouse for the parents and the general public have been one valuable form of educating the community and welding it together for the common good.

(*b*) Clubs and other associational groups.

(1) Boys' and girls' club work.

(2) Young people's clubs.

(3) Women's clubs.

I. Socialization of the rural districts—Continued.
1. The chief ways in which social rural backwardness has been attacked, etc.—Continued.
(*b*) Clubs and other associational groups—Contd.
(4) Farmers' organizations.
(*a*) Grange.
(*b*) Farmers' institutes
(*c*) Farmers' clubs, etc.
(*d*) County and State farm bureaus.
(*c*) Libraries.
(1) Small town or village library. It functions as:
(*a*) A meeting place for other activities.
(*b*) Source of books, pamphlets, and periodicals in public reading rooms and loan system.
(*c*) Exhibition place for traveling exhibits, health, art, educational, etc.
(2) Rural school libraries.
(3) Traveling libraries going either to home or to small libraries from State headquarters.
(4) County library system. This consists of a central library, substations, and a system of dispensing and collecting books.
(*d*) Social center work.
(1) This work has developed as part of the community-center movement which has spread recently throughout the Nation.
(2) Centers develop in the country as—
(*a*) Rural school centers.
(*b*) Rural club centers.
(*c*) Rural church center.
(*d*) Rural municipal center (township, county seat, village).
(3) The activities of centers differ. They may take the form of—
(*a*) Games.
(*b*) Singing.

I. Socialization of the rural districts—Continued.
1. The chief ways in which social rural backwardness has been attacked, etc.—Continued.
(*d*) Social center work—Continued.
(3) The activities of centers differ—Contd.
(*c*) Dancing, gymnastics, swimming.
(*d*) Schools and lecture courses.
(*e*) Moving pictures and talks.
(*f*) Pageants, plays, fairs.
(*g*) Picnics, banquets, suppers.
(*h*) Community betterment projects.
(*e*) Churches and certain religious organizations.
(1) There is a strong movement at the present time to vitalize the rural church and to enlarge its scope to meet the needs of modern rural life. (See Mills, pp. 113–126.)
(2) The interchurch world movement has made county surveys.
(3) The Young Men's Christian Association has developed work in certain rural areas.
(4) The Young Women's Christian Association has developed work in certain rural areas.

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OUTLINE 6. INCOME AND STANDARD OF LIVING.

Minimum quantity and cost budgets necessary for different levels or standards of living have been formulated by economists and social workers on the basis of an "average family" of five persons, father, mother, and three children under 14 years of age. The minimum standard for the welfare of children is that known as the "health and reasonable comfort level," since a lower standard of living makes no provision for elements essential to growth, physical, mental, and moral. Although this standard is a minimum one for normal development, investigations have shown that the great majority of families in the United States do not have an income sufficient to maintain it. As a result large numbers of children are inadequately fed and clothed and poorly housed. They do not receive necessary medical and nursing care. In many cases they are deprived of a mother's care, since the mother must be gainfully employed in order to eke out the family income. They themselves must leave school and go to work at an early age, to the detriment of their physical development and their education. From the ranks of the very poor and from those forced to premature wage earning are recruited also many of the juvenile delinquents.

Mothers' pension laws and the various forms of social insurance are attempts to provide an adequate minimum income or to supplement inadequate ones. Public measures, such as housing laws and housing reform, municipal sanitary regulations, the provision of

playgrounds and of public baths, clinics, public-health nurses, and child-welfare centers, all indicate efforts to provide necessities and comforts demanded by a healthful standard of living. The possession by the father of an income sufficient to provide a decent and comfortable home for his family and which will permit the mother to stay at home and give the children a mother's care is, however, indispensable to the welfare of children.

I. STANDARDS OF LIVING.

A. The poverty level.
   1. Quantities allowed in this budget are barely sufficient to "keep body and soul together."
   2. This is the level just above that where the family must seek aid of charity or fall into debt.

B. The minimum of subsistence level.
   1. This budget provides for food, shelter, and bodily covering sufficient to maintain physical efficiency.
   2. It makes no provision for comfort, education, or recreation, or for sickness, unemployment, accident, fire, death of wage earner, or old age.

C. The health and reasonable comfort level.
   1. This budget provides adequate food, shelter, clothing, with some regard to individual taste.
   2. It contains provision for wholesome recreation, education, home life, and self-development.
   3. It furnishes a small amount of life insurance, but makes no provision for other savings. The absence of "emergency savings" is its chief defect.
   4. This is the minimum standard consistent, if liberally interpreted, with normal development for children.

II. THE MINIMUM STANDARD CONSISTENT WITH NORMAL DEVELOPMENT OF CHILDREN.

A. Quantity budget.
   1. Food must be adequate to maintain health and efficiency and to further physical development.
      (*a*) Amount.
         (1) Based on the energy requirements of the average man doing moderately heavy work, i. e., 3,500 calories per day. An adult woman requires 90 per cent as much. (For requirements of children, see Section II, Outline 5, Topic II; Outline 6, Topic III.)

A. Quantity budget—Continued.
1. Food must be adequate, etc.—Continued.
(*b*) Variety.
(1) To furnish the proper proportion of protein, carbohydrates, fats, and protective foods.
(2) To permit the exercise of some choice and the satisfying of normal appetite.
(*c*) Provision of growth foods, such as milk, eggs, butter, etc., for children, and for expectant and nursing mothers.
2. Housing must be adequate to maintain health decency and normal social life for adults and children.
(*a*) Location.
(1) In decent neighborhood, removed from places used for gambling or unwholesome amusement.
(2) Near playground, unless house lot gives play space.
(*b*) Space.
(1) Sufficient sleeping rooms so that no more than two persons are required to occupy one bed, and so that there will be a bedroom for the parents, and at least one for the children of each sex.
(2) Two rooms for cooking, eating, and social purposes.
(3) Cubic space to accord with minimum housing standards. (See Standards Recommended for Permanent Industrial Housing Developments, p. 11.)
(*c*) Sanitation.
(1) Light.
(*a*) There should be no "dark rooms" or cellar apartments.
(*b*) Sunlight should enter at least some rooms each day.
(2) Ventilation.
(*a*) Each room should have at least one window opening directly to outer air.
(*b*) Each room should have cross ventilation.

A. Quantity budget—Continued.
2. Housing must be adequate, etc.—Continued.
(*c*) Sanitation—Continued.
(2) Ventilation—Continued.
(*c*) Window space per person per room should meet minimum housing standards. (See Standards Recommended for Permanent Industrial Housing Developments, p. 11.)
(3) Cleanliness and good repair.
(4) Toilet facilities for the use of the family alone and a bathroom, if possible.
(5) Convenient water supply.
(*d*) Heating.
(1) To permit of heating the principal living rooms comfortably in the coldest weather.
(*e*) Other considerations.
(1) In apartments or tenements.
(*a*) The common hall and stairway should be kept well lighted and ventilated.
(*b*) There should be adequate fire escapes for the use of each family.
(2) Where there are babies or very young children, a porch or a "backyard," or both, are highly desirable.
3. Clothing must be sufficient to afford protection, cleanliness and self-respect.
(*a*) Amount.
(1) Changes for reasonable standard of cleanliness.
(2) Night and day garments.
(3) Some garments for Sunday and holiday wear.
(4) Special protection in wet or stormy weather.
(*b*) Quality and condition.
(1) Sufficiently good to be durable.
(2) Sufficiently warm for protection in cold weather.
(3) Whole garments, and shoes, especially for children, in proper condition to keep feet warm and dry.

A. Quantity budget—Continued.

3. Clothing must be sufficient, etc.—Continued.
   - (*c*) Style.
     - (1) Sufficient to permit the family members to appear in public and among friends without mortification.
     - (2) Of special importance during adolescence, hence some concession to the tastes of adolescent boys and girls should be permitted.
   - (*d*) Toilet articles.
     - (1) Necessary for personal cleanliness and health.
4. Household equipment should be sufficient for comfort.
   - (*a*) Furniture and furnishings.
     - (1) Sufficient for the ordinary uses of the family.
     - (2) To be kept in good condition, and replaced when necessary.
   - (*b*) Bedding.
     - (1) Linen sufficient for cleanliness.
     - (2) Covering sufficient for warmth when windows are open at night.
5. Education should be such as to afford a basis for intelligent citizenship.
   - (*a*) For children.
     - (1) Every child should be able to stay in school until he is at least 16 years old.
   - (*b*) For adults.
     - (1) A daily newspaper is a minimum essential.
6. Medical and dental care should be sufficient to maintain physical vigor.
   - (*a*) Preventive care for children.
     - (1) Physical defects in young children should be removed.
     - (2) Teeth should be kept in good condition.
   - (*b*) Maternity care.
     - (1) The minimum care necessary to insure health to mother and child is described in the U. S. Children's Bureau "Minimum Standards for Child Welfare."

A. Quantity budget—Continued.

6. Medical and dental care, etc.—Continued.

(*c*) Care in illness.

(1) A physician in emergencies should be available.

(2) The budget should provide for necessary medicines, etc.

(3) Where tuberculosis, malnutrition, anemia, or other abnormal condition is present there should be provision for extra nourishment.

7. Recreation is necessary for health, and some provision should be made for it.

(*a*) Occasional moving-picture shows.

(*b*) Family outings or picnics.

(*c*) Occasional church or club entertainment.

8. Insurance and savings should provide protection according to the needs of the individual family.

(*a*) Life insurance in case of the death of the father.

(*b*) Endowment insurance or savings funds for old age.

(*c*) Fire insurance on furniture.

(*d*) Savings for sickness, accident, unemployment, or other emergency.

9. Miscellaneous expenses should include:

(*a*) Necessary car fares.

(*b*) Church contributions and organization dues.

(*c*) Cleaning supplies.

(*d*) Incidentals, such as moving expenses, stationery, postage, telephoning, etc.

B. Cost budget.

1. Cost budgets recently formulated on the basis of a standard of health and reasonable comfort are given in Table XXII, which estimates living costs in May, 1920, when prices were at the peak, and for several earlier dates in the years 1918–1920. Since May, 1920, the decline in prices has been marked.

B. Cost budget—Continued.

TABLE XXII.—*Comparison of costs.*[1]

	Washington budget, August, 1919.[2]	Ogburn's coal miners' budget, January, 1920.[3]	Philadelphia budget, autumn, 1918.[4]	Fall River budget, October, 1919.[5]	Lawrence budget, November, 1919.[5]
Food	$773.93	$801.38	$660.09	$631.80	$652.60
Clothing	513.72	455.26	299.43	322.25	340.26
Housing	300.00	216.00	240.00	182.00	234.00
Fuel and light	128.00	70.00	75.00	84.25	87.98
Miscellaneous	546.82	576.50	362.27	353.60	343.20
Total cost when study was made	2,262.47	2,118.94	1,636.79	1,573.90	1,658.04
Estimate increase in cost of living since study was made (to May, 1920) ..... per cent..	12	3	28	9	8
Approximate cost, May, 1920	2,533.97	2,182.51	2,095.09	1,715.55	1,790.68

[1] From "Studies of the cost of maintaining a family at a level of health and reasonable comfort," presented by W. Jett Lauck before the United States Railway Labor Board, 1920, p. 7.
[2] The Washington, D. C., budget of the U. S. Bureau of Labor Statistics (without deductions).
[3] The Bituminous Coal Miners' Budget of Prof. Ogburn.
[4] The budget worked out by the Philadelphia Bureau of Municipal Research.
[5] The Fall River and Lawrence budgets of the National Industrial Conference Board (the "more liberal standard" being used in each case).

2. The cost budget is less significant than the quantity budget, owing to variation in prices, or "changes in the cost of living."

C. Budgetary standards versus actual conditions.

1. Budgets are formulated for the "average family" containing three children whereas large families are common in the lower income groups.
2. Budget quantities make no provision for unavoidable waste or accident, and presuppose an industry, thrift, and self-control above the average in every member of the family.
3. Budget quantities and costs demand a housewife above the average in household management, skillful in purchasing, cooking and sewing; and with a precise knowledge of food values such as relatively few women, even in the higher income groups, possess.

III. PREVALENCE OF INCOMES BELOW THE COST OF A STANDARD OF HEALTH AND REASONABLE COMFORT.

Extended investigations have shown that large numbers of workingmen earn so little that their families can not keep well, and their children can not develop into healthy, vigorous citizens.

A. Incomes and cost of living as shown by investigations.

1. In 1901, the annual earnings of heads of 25,440 families were in 29.6 per cent of the cases under $500 a year; in 82.2 per cent less than $800; in 94.6 per cent less than $1,000 (see Eighteenth Annual Report U. S. Com-

A. Incomes and cost of living as shown by investigations—Contd.

1. In 1901, the annual earnings, etc.—Continued.
missioner of Labor, 1903, p. 285), yet the cost of mere subsistence at that time was placed at practically $700 a year. (See Eighteenth Annual Report, p. 367.)
2. Of more than 22,000 babies studied by the United States Children's Bureau (1913–1915) and representing every type of home in seven cities, only 1 in 10 was in a family where the father's earnings reached what at that time was a fair minimum for comfort.
3. Of 2,110 families in Washington, D. C., in 1916, 38 per cent had annual incomes of less than $900, and 61 per cent less than $1,200, including earnings of wife and children under 16 years of age (see Monthly Labor Review, October, 1917, p. 4). Yet $1,200 was estimated as the minimum of comfort budget for the "average family" in Washington in 1916. (See Monthly Labor Review, January, 1919, p. 9.)
4. In 1917–18, an investigation into the living conditions of 2,084 families in New York City representing "a fairly typical cross section" showed that 51 per cent had a total annual income not exceeding $900, and about 72 per cent had a total annual income not exexceeding $1,200, including earnings of wives and children under 16 years of age (see Harris, Some Medical Aspects of the High Cost of Living, p. 6). Yet in 1918, the United States Bureau of Labor Statistics found that the average white family in Washington, D. C., could not make both ends meet on less than $1,800 a year. (See Monthly Labor Review, January, 1919, p. 9.)
5. A cost of living survey in 92 industrial cities made by the United States Bureau of Labor Statistics in 1918–19 showed that the average annual earnings of the father in white families was $1,349.15, and in colored $976.44. (See Monthly Labor Review, December, 1919, p. 40. (Compare with Table XXII.)

IV. RELATION OF INCOME TO MORBIDITY AND MORTALITY.

A. Among adults.

1. Sickness and premature death are more common among the poor than among the well to do.
   (*a*) Inadequate food, deficient clothing and shelter, lessening the vitality and making the individual more susceptible to disease.

A. Among adults—Continued.

1. Sickness and premature death, etc.—Continued.

(*b*) Long hours of work and unhealthy conditions of work causing much sickness.

(*c*) Low incomes, generally meaning a lack of proper medical and nursing care, which may result in death, chronic disease, or impaired vitality. "There is a remarkable increase (in expenditures for sickness) with the increase in amount of income. This indicates that those in the lower income groups are not able to pay for adequate medical and hospital service, for no one would contend that those in the higher income groups are squandering money recklessly on physicians, surgeons, dentists, and the like." (See Meeker, What is the American Standard of Living, p. 8.)

(*d*) Unhygienic living, undernourishment, or exposure, leading to many of the diseases with the highest mortality rates, such as tuberculosis, typhoid fever, and pneumonia.

2. Children suffer from the sickness or premature death of parents.

(*a*) From reduced family income during the illness of the father, many families which can live fairly comfortably on the father's earnings being reduced to pauperism as soon as the breadwinner is unable to work.

(*b*) From neglect, and, in the case of the oldest girl, loss of schooling during the illness of the mother.

(*c*) From neglect, destitution, or lack of a home when the father or mother dies.

(1) Breaking up of home.

(2) Increase in infant mortality. The rate for motherless babies has been shown to be from 3 to 5 times as great as among those whose mothers live. (See Woodbury, Infant Mortality Studies of the Children's Bureau, p. 42.)

(3) Increase in child labor caused by the necessity for self-support or support of a widowed mother. The most intensive study ever made of children leaving school for work showed that

A. Among adults—Continued.
2. Children suffer, etc.—Continued.
(*c*) From neglect, destitution, etc.—Continued.
(3) Increase in child labor, etc.—Contd. one-fifth of the children had widowed mothers. (See Summary of Report on Woman and Child Wage Earners, p. 265.)
(4) Increase in juvenile delinquency. More than one-fourth of the delinquent children brought before the Chicago Juvenile Court between July 1, 1899, and June 30, 1909, had lost father, mother, or both parents. (See Breckenridge and Abbott, The Delinquent Child and the Home, p. 91.)

B Among children.
1. Poverty often precludes adequate prenatal and confinement care, so that the children in families whose income is below the minimum for health and reasonable comfort are in many cases born with little vitality. It means lack of food or of the right kind of food, of fresh air, sunlight, sanitation, and cleanliness, all of which are essential to normal development.
2. Inadequate income is almost invariably associated with a high infant mortality.
(*a*) Series of studies of infant mortality made by the United States Children's Bureau. (See Lathrop, Income and Infant Mortality.)
(1) Johnstown, Pa.: Infant mortality rate 260.9 when the father earned less than $550 a year, 87.6 when he earned $1,250 or more.
(2) Manchester, N. H.: Infant mortality rate 204.2 when the father earned less than $550, 58.3 when the father earned $1,250 or more.
(3) Waterbury, Conn.: Infant mortality rate 151.1 when the father earned less than $550 a year, 68.4 when the father earned $1,250 or over.
(4) Saginaw, Mich.: Infant mortality rate 142 when the father earned less than $550, 22.2 when the father earned $1,250 and over.

B. Among children—Continued.

2. Inadequate income, etc.—Continued.

(*a*) Series of studies, etc.—Continued.

(5) New Bedford, Mass.: Infant mortality rate 168.7 when the father earned less than $550, 59.9 when the father earned $1,250 and over.

(6) Akron, Ohio: Infant mortality rate 117.5 when the father earned under $550, 40 when the father earned $1,250 and over.

(7) Baltimore, Md.: Infant mortality rate 138 when the father earned under $550, 64.7 when the father earned $1,250 and over.

3. The mother's ignorance of child care is more dangerous among the poor, since she can not pay for expert medical advice and trained nursing care for her children.

4. The same conditions which cause a high infant mortality cause sickness and death among older children. Those who survive infancy are in many cases seriously impaired in health and vitality.

V. RELATION OF INCOME TO MALNUTRITION.

A. Inadequate diet.

1. Half of the white families and 78 per cent of the colored families in an investigation into the cost of living in Washington, D. C., in 1916, spent for food less than the $137.50 per year per adult male estimated as the minimum for health and reasonable comfort. (See Monthly Labor Review, January, 1919, p. 9.)

2. An investigation in New York City on the high cost of living in relation to health (see Topic III, A, 4) disclosed the following changes in diet resulting from the high cost of living:

(*a*) Meat eliminated from dietary in over 37 per cent of the families and reduced in 17 per cent.

(*b*) Eggs eliminated in almost 40 per cent of the families; in 532 families from the diet of children.

(*c*) Butter eliminated in almost 30 per cent of the families; in 370 families from foods given to children.

(*d*) Sugar eliminated in almost 7 per cent of the families and omitted from children's dietary in 71 families.

A. Inadequate diet—Continued.

2. An investigation, etc.—Continued.

(*e*) Milk eliminated from children's dietary in 296 families and considerably reduced in 71. (See Harris, Some Medical Aspects of the High Cost of Living, pp. 12–13.)

3. The food consumed in five cities in the North Atlantic States covered by the cost of living survey of the Bureau of Labor Statistics, 1918–19, fell from 330 to 755 calories per adult male below the 3,500 daily calorie allowance generally recognized as the standard. (See Monthly Labor Review, July, 1920, p. 10.)

4. Investigations in city schools from time to time have shown that there are large numbers of hungry children.

5. Studies made by the United States Children's Bureau show that children were deprived of milk and were given tea and coffee in its place, when the cost of milk increased. (See Studies of Use of Milk by Families Having Little Children.)

(*a*) Baltimore: Sixty-six per cent of the children 7 years old and younger (excluding breast fed) in families visited were receiving no fresh milk in 1918.

(*b*) Washington, D. C.: Forty-five per cent of the children (excluding breast fed) in families visited, 7 years and younger, were receiving no fresh milk in 1918.

(*c*) New Orleans: Seventy per cent of the children under 8 years (excluding breast fed) in families visited were receiving no fresh milk in 1918.

6. Inadequate diet may be caused by lack of knowledge of food values.

(*a*) Poverty in many cases is the real cause of ignorance, causing the mother's lack of training in youth, and depriving the home of educative influences.

B. Other causes of malnutrition in children.

1. Insufficient sleep and rest.

(*a*) Bad effect on children's rest of overcrowding and noise, commonly found in tenements and neighborhoods where families with low incomes live.

2. Physical defects, such as bad teeth and tonsils.

(*a*) Cost of medical and surgical care beyond the reach of the low-paid worker.

C. Parents' inability to exact good habits in regard to eating, sleeping, etc.
   1. Recognized as an important factor in malnutrition.
   2. Lack of parental control, while not confined to any economic group, aggravated by overwork, especially of the mother, and low standard of living.

VI. RELATION OF INCOME TO CARE GIVEN CHILDREN BY MOTHER.

A. Gainful employment among mothers.
   1. The family income in an appreciable number of cases is supplemented by the wife's earnings.
      (*a*) 6.9 per cent of 15,704 wage earners' families investigated in 1907–1909 aided by wife's earnings. (See Reports of the Immigration Commission, vol. 1, p. 414.)
      (*b*) 8.9 per cent of the white wage earners' families and 43.7 per cent of the colored wage earners' families in 92 localities in the United States in 1918–19 aided by wife's earnings. (See Monthly Labor Review, December, 1919, p. 32.)
   2. Poverty is usually the cause for the mother's going to work.
      (*a*) Decrease in number of mothers gainfully employed with increase in father's earnings. Series of infant mortality studies made by United States Children's Bureau.
         (1) Manchester, N. H.: 73.3 per cent of the mothers gainfully employed after the baby's birth when the father earned less than $450; 9.6 per cent when the father earned $1,050 or more.
         (2) Waterbury, Conn.: 53.3 per cent of the mothers gainfully employed after the baby's birth when the father earned less than $450; 9.9 per cent when the father earned $1,250 or more.
   3. Even when the mother in families with low incomes does not go out to work she is likely to keep lodgers or "take in" work.
      (*a*) Overcrowding and confusion in the home as a result.

B. Effects on children of mother's employment.
   1. The mother in some cases suffers from the conditions of her work and can not bear healthy children.
   2. The mother who goes out to work does not, in most instances, breast feed her baby.
   3. The working mother is often overworked because of her double duties and as a result her children are neglected.

VII. RELATION OF INCOME TO CHILD LABOR.

A. Poverty, past or present, the chief cause of child labor. (See Section VI, Outline 3, Topic I, A.)
   1. Family necessity is responsible for a large proportion of the gainful employment among children under 16 years of age.
   2. Parents' ignorance of the value of an education usually results from lack of opportunity in early life.

B. Extent of assistance given family income by children's work.
   1. In more than one-fifth of 15,704 wage earners' families in 1907–1909, children contributed to the family income. (See Reports of the Immigration Commission, vol. 1, p. 414.)
   2. In 18.6 per of white wage earners' families and 24.6 per cent of colored wage earners' families in 92 localities in the United States in 1918–19, children contributed to the family income. (See Monthly Labor Review, December, 1919, p. 32.)

C. Effects of child labor on the welfare of children.
   1. Children who are prematurely employed are deprived of the opportunity for normal physical development, a good education, and wholesome play. (See Section VI, Outline 3, Topic II.)

VIII. RELATION OF INCOME TO JUVENILE DELINQUENCY.

A. Extent of poverty as a factor in delinquency.
   1. A study of 584 delinquent boys and 157 delinquent girls in Chicago showed that 38.2 per cent of the boys and 68.8 per cent of the girls came from "very poor" families; 37.9 per cent of the boys and 21 per cent of the girls from "poor" families; and only 1.7 of the boys and 1.3 per cent of the girls from "comfortable" families. (See Breckinridge and Abbott, The Delinquent Child and the Home, p. 72.)

B. How low income contributes to juvenile delinquency.
   1. Homes are in congested neighborhoods where there are few opportunities for wholesome recreation and many for wrongdoing.
   2. Overcrowding in the home, especially if caused by lodgers, helps to break down delicacy and reserve and frequently corrupts morals.
   3. Actual want leads children to steal wood, coal, and other necessities of life.
   4. Lack of spending money causes children to steal.
   5. Desire for adventure in boys, unsatisfied in monotonous surroundings, seeks an outlet in building fires, stealing rides, loitering on railroad tracks, etc.
   6. Desire for good clothes and amusements on the part of girls leads to immorality.
   7. Occupations which young children enter offer many temptations. (See Section VI, Outline 3, Topic II, D, 2.)

IX. EFFORTS TO SUPPLEMENT INCOME OR RAISE STANDARD OF LIVING THROUGH PUBLIC MEASURES.

A. Social insurance.
B. Mothers' pension laws.
C. Housing laws and housing reform.
D. Provision of playgrounds.
E. Establishment of systems of public health nursing, clinics and children's health centers.

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OUTLINE 7. PUBLIC ACTIVITIES TO PROTECT MATERNITY, INFANCY, AND CHILDHOOD.

More than 17,000 women die yearly in the United States and many more suffer ill health from causes incident to child bearing. This condition is now known to be largely preventable through provision for adequate care during pregnancy and confinement.

Over 200,000 babies less than a year old die annually in the United States. To a great extent this loss of infant life may be prevented. Studies made by the Children's Bureau show the close relationship between unhygienic surroundings and ignorance and high maternal and infant mortalities.

There is also a high mortality among children as a result of communicable diseases, especially the so-called children's diseases. Such infectious disease is one of the chief causes of death in childhood, and annually accounts for over 20,000 lives. Communicable disease may be controlled in large measure by public and private cooperation.

I. PUBLIC MEASURES FOR THE PROTECTION OF MATERNITY AND INFANCY.

The protection of motherhood has developed in different countries along various lines, namely:

A. The provision of good nursing and medical services, including instruction in prenatal hygiene of the mother and the child, either free or for a small sum.

B. A cash bonus paid by the State for each living birth.

C. A system of voluntary insurance funds receiving State subsidy, by which money and medical and institutional care may be made available for women in childbirth who are eligible for the maternity benefit.

D. Prohibition of employment of women for a certain period before and after confinement.

II. PUBLIC PROTECTION OF MATERNITY AND INFANCY IN CERTAIN FOREIGN COUNTRIES.

(See Save the Youngest.)

In estimating the possibilities of such work the achievements of certain foreign countries must be considered:

A. New Zealand.

Probably no country has so successfully attacked the subject of the reduction of the number of deaths of infants. As a result, in 1919, New Zealand had the lowest infant death rate in the world, 45 per 1,000 live births. The work done has consisted in—

1. A widespread dissemination of knowledge affecting the health of women and children, through the work of the New Zealand Society for the Health of Women and Children, founded in 1907.
2. The training of qualified nurses, so-called Plunket nurses, to give instruction and actual assistance to child-bearing women.
3. Maintenance of public-health visiting nurses in all districts.
4. Establishment of hospitals for maternity and infant care.
5. Maternity benefits, as a feature of an old age and invalidity voluntary insurance fund (these were begun in 1910, but have not been generally used).

B. England.

The work done in England and Wales even during the period of the World War toward safeguarding the life and health of women and small children resulted in reducing infant mortality to the lowest point ever reached in the history of the nation and in establishing the most far-reaching public health measures ever attempted. The work includes:

1. Compulsory notification of births within 36 hours.
2. Government aid for approved local maternity and infant welfare work, amounting to not more than 50 per cent of approved expenditure.
3. Publication of a detailed Government plan for such work, including prenatal, natal, and postnatal measures.
4. Establishment of health visitors. (The number was increased from 600 in 1914 to the equivalent of 1,600 full-time visitors in 1920. This represented one health visitor for every 500 births annually.)
5. Establishment of welfare centers for the medical supervision of expectant and nursing mothers and children under 5 years of age. (In 1920, there were 1,754 of these in England and Wales alone.)

B. England—Continued.

6. Supervision of midwifery and the provision of free prenatal and confinement care, including nursing service and hospital treatment, when needed.
7. The provision of milk and other food, if necessary free of charge, for expectant and nursing mothers and children under 5 years of age.
8. The provision of home helps to undertake, during the mother's confinement, the ordinary duties in the home usually undertaken by the mother. (This is the first time a Government has paid for domestic service during time of sickness.)
9. A maternity benefit of 30 shillings ($7.50) for each case of childbirth to be paid the wife of an insured man, and a double benefit if the wife is in addition herself insured. (See health insurance act of 1911, and amending act of 1913.)
   (*a*) Women receiving this benefit are usually expected to abstain from work during four weeks after confinement.
   (*b*) There is no provision for medical attendance or for instructing the mother in child hygiene.
   (*c*) In 1914 a total of over 9,000,000 women were entitled to this benefit, and the total expenditure was $7,154,982. (See Harris, pp. 96, 100.)
10. The prohibition of the employment of women for four weeks after confinement. (See Great Britain Factory Act, 1901.)

C. Australia.

1. In this country, we have an example of the cash bonus system of giving a lump sum of money for each case of childbirth, without provisions for instruction or skilled prenatal and confinement care.
   (*a*) Since October 12, 1912, the Australian Commonwealth has allowed the sum of $25 for each living birth; the acceptance of this allowance is now general.
   (*b*) The maternal and infant death rates in Australia are above those in New Zealand (see Save the Youngest), and the decrease in maternal mortality following the giving of bonuses was not so great as it had been during the preceding years.

C. Australia—Continued.

(*c*) The committee reporting on this subject to the Australian parliament, in 1917, urged that the money expended annually could be used to much greater advantage if spent, as in New Zealand, for the practical measures of educating the mother and affording her skilled nursing and medical service.

D. France.

In certain ways, France has always led in inaugurating methods of handling fundamental health problems.

1. Since 1913, any woman dependent on her earnings (not agricultural labor) is granted a daily allowance during a period of eight weeks at childbirth with an additional bonus of 14 francs paid at the end of four weeks if she nurses her child. In 1917, this aid was extended to the wives of men in military service entitled to a separation allowance.
2. Since 1909, a woman stopping work in an industrial establishment for an approaching confinement is assured her position again on application.
3. Since 1913, no woman can be employed in an industrial or commercial undertaking within four weeks after confinement. The employment of women after childbirth in carrying, hauling, or pushing weights is prohibited.
4. Volunteer visitors are used to instruct mothers receiving maternity benefits on the subject of personal hygiene for themselves and their children.
5. The establishment of free hospital beds for confinement, free consultation centers for pregnant women, and additional infant welfare centers was one result of the war.
6. Industries employing women must allow nursing mothers time to feed their babies. Large establishments must provide nursing rooms.

E. Other countries. (See Meigs; also Harris.)

F. Proposed international measures.

Certain recommendations concerning the employment of women before and after childbirth were adopted by the International Labor Conference which was held at Washington in 1919.

F. Proposed international measures—Continued.

"In any public or private industrial or commercial undertaking or in any branch thereof, other than an undertaking in which only members of the same family are employed, a woman—

1. "Shall not be permitted to work during the six weeks following her confinement.
2. "Shall have the right to leave her work, if she produces a medical certificate stating that her confinement will probably take place within six weeks.
3. "Shall, while she is absent from her work (in pursuance of pars. 1 and 2), be paid benefits sufficient for the full and healthy maintenance of herself and her child, provided either out of public funds or by means of a system of insurance, the exact amount of which shall be determined by the competent authority in each country, and as an additional benefit shall be entitled to free attendance by a doctor or certified midwife.
4. "Shall in any case, if she is nursing her child, be allowed half an hour twice a day during her working hours for this purpose."

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III. PROTECTION OF MATERNITY AND CHILDHOOD IN THE UNITED STATES.

A. Measures proposed and adopted for the public protection of maternity and infancy to be enforced through Federal and State Governments.

1. Proposed measures.

(*a*) Federal aid to the States for the protection of maternity and infancy proposed. (See Sheppard-Towner bill, S. 1039; H. R. 2366, 1921.)

(1) Financial and administrative provisions.

The bill authorizes the annual appropriation of $1,480,000 to be paid to the several States for the purpose of cooperating with them in promoting the care of maternity and infancy. Of this sum, $10,000 is to be paid annually to each State accepting the provisions of the act, and $1,000,000 is to be apportioned among the States in the proportion which their population bears to the total population of the United States, but no State is to receive its share of this additional appropriation until its legislature has appropriated an equal sum for the purposes contemplated in the act. The Children's Bureau is to be charged with the carrying out of the provisions of the act, and the Chief of the Children's Bureau, as executive officer, is authorized to form an advisory committee consisting of the Secretary of Labor, the Surgeon General of the United States Public Health Service, and the United States Commissioner of Education. States are to designate or create State agencies to administer the act.

(2) The bill specifies that provision be made for instruction in the hygiene of maternity and infancy through public health nurses, consultation centers, and other suitable methods.

(3) In 6 States measures have been passed accepting the provisions of the Sheppard-Towner bill, should it become a law.

A. Measures proposed and adopted, etc.—Continued.

1. Proposed measures—Continued.

(*b*) Maternity benefit systems, in the form of a money payment, or medical and nursing services, have been proposed in several States.

2. Adopted measures.

(*a*) In Colorado, Missouri (except Jackson County [Kansas City] and St. Louis), Pennsylvania, and South Dakota aid may be given expectant mothers under the mothers' pension laws of these States. (In Missouri, this is limited to three weeks before and three weeks after childbirth, and in Pennsylvania to expectant mothers eligible for aid on account of one or more living children.)

(*b*) The employment of women before and after childbirth is prohibited in certain States:

(1) In Connecticut no woman is to be employed in factory, mercantile establishment, mill, or workshop within four weeks before or four weeks after confinement.

(2) In Massachusetts no woman is to be employed in a mercantile, manufacturing, or mechanical establishment within two weeks before or four weeks after childbirth.

(3) In Missouri no woman is to be employed for three weeks before or three weeks after childbirth in any manufacturing, mechanical, or mercantile establishment, factory, workship, laundry, bakery, or restaurant, or any place of amusement or express or transportation or public utility business, or by any common carrier, or by any public institution, incorporated or unincorporated.

(4) In New York no woman is to be employed in a factory, mercantile establishment, mill, or workshop within four weeks after childbirth.

(5) In Vermont no woman is to be employed in a mill, cannery, workshop, or factory, or in any manufacturing

A. Measures proposed and adopted, etc.—Continued.
2. Adopted measures—Continued.
(*b*) The employment of women, etc.—Continued.
(5) In Vermont, etc.—Continued.
or mechanical establishment within two weeks before or four weeks after childbirth.
(*c*) In some States midwives are required to hold licenses, to meet certain educational qualifications, and to conform to certain standards (in a few cities schools for midwives have been established).
(*d*) The majority of States have laws requiring the registration of births; such laws are, however, not always adequate nor everywhere properly enforced. (See Section I, Outline 1, Topic I and II.) Complete registration of births may be made the basis of various activities for better maternal and child care.
(*e*) In many States the immediate reporting of cases of babies' sore eyes (ophthalmia neonatorum) is required by law.
(*f*) In most States the dairy business is supervised and the quality of milk and condition of dairies is required to meet a certain standard.
(*g*) In most States certain serious communicable diseases, including the common children's diseases, must be reported to the State board of health. (See Section III, Outline 3, Topic VI, C, 1, a.) Such measures as quarantine, isolation of the patient and exposed persons, elimination of the source of infection, or treatment, are then enforced.
(*h*) In some States the reporting of venereal diseases is compulsory.
(*i*) In many States maternity hospitals, day nurseries, boarding homes, and institutions caring for children are inspected, licensed, and required by law to meet certain standards.

B. Government agencies working for the welfare of the mother and child.
1. Federal agencies.
(*a*) United States Children's Bureau.
The Children's Bureau in the Department of Labor, created in 1912, was instructed to

B. Government agencies, etc.—Continued.

1. Federal agencies—Continued.

(*a*) United States Children's Bureau—Continued. investigate and report on all matters pertaining to the welfare of children and child life. The work of the bureau includes investigation and research and the promotion of the welfare of children through the publication and distribution of scientific and popular material, demonstration conferences in infant and child hygiene, and cooperation with public and private organizations.

(*b*) Other Federal agencies carrying out important work affecting the health and welfare of children are: The Bureau of Education, Department of the Interior; the Public Health Service, Treasury Department; the States' Relations Service, Department of Agriculture; the Federal Board for Vocational Education; and the Office of Internal Revenue, Treasury Department (enforcing child labor tax law).

2. State and city agencies.

(*a*) Up to July, 1921, 38 States had formed child hygiene divisions, or bureaus, in most cases under the State boards of health.

(1) These departments were created to work especially for the betterment of health conditions among children.

(2) Their activities include educational campaigns, exhibits, the issuing of bulletins and pamphlets, the establishment of public health nursing and children's health centers throughout their respective States, and other activities promoting the health of children. (The annual reports and publications of these divisions may usually be secured free of charge.)

(*b*) In 23 States, in 1920, there were State supervising nurses employed by the State departments of health as directors of bureaus or divisions of public health nursing.

B. Government agencies, etc.—Continued.
2. State and city agencies—Continued.
(*c*) In 1920, 2 States had mandatory laws, compelling every county to have a public health nurse; in 16 States there were permissive laws allowing the use of county funds for this purpose.
(*d*) A number of the large cities have also established bureaus or divisions of child hygiene whose work is similar to that of the State organizations, but is confined to the city in which the bureau is situated (visiting nurses are employed in all such divisions, or cooperate with them).

C. Measures for the protection of mothers and infants (supported largely by private enterprise).
1. Public health nursing service. (See B, 2, *c*.) Employment of a public health nurse is the most effective method of protecting the health of the mothers and babies of a community. Rural as well as urban communities should have the benefit of such service.
(*a*) The work of a public health nurse may include:
(1) Assisting with the work of clinics and health centers.
(2) Educational work with school children, groups of mothers, and in individual homes.
(3) Emergency nursing in homes.
(4) Measures to insure proper public sanitation.
(*b*) The National Organization of Public Health Nursing, the Red Cross Public Health Nursing Service, and the National Tuberculosis Association are forwarding the education of the public health nurse, and enlarging her field of work.
2. Prenatal and maternity centers. (See Section I, Outline 3, Topic V; also Minimum Standards for Child Welfare, p. 6.) The care of the expectant mother is the most essential method of insuring the health of the infant.
(*a*) The service of such centers may be free, or in return for the payment of a moderate sum. It may include:
(1) Examination, advice, and minor treatment at the clinic by a physician.

C. Measures for the protection of mothers and infants—Continued.

2. Prenatal and maternity centers—Continued.

(*a*) The service of such centers, etc.—Continued.

(2) Care and instruction of special cases in the home by nurses.

(3) Distribution of milk, and the serving of properly nutritious foods for small sums.

(4) Arrangements for proper care at confinement when necessary.

(*b*) Maternity centers have developed in only a few of our large cities. Further growth may be expected owing to the wide interest felt in the protection of maternity.

3. Out-patient obstetrical service.

Such service may be in connection with maternity and general hospitals, and may be free or in return for a small sum. Cases are cared for in their own homes by doctors and nurses from the hospital. In the case of complications, the patient is usually brought in to the hospital. (In cities where there are medical schools, such service is maintained for educational purposes.)

4. Maternity hospitals, or separate maternity wards.

(*a*) A community should have adequate provision for the hospital treatment of obstetrical cases. Such treatment should be within the reach of all classes of people, especially the middle class, who can not afford the services of a private nurse and obstetrician, and who will not accept free out-patient obstetrical service. Semiprivate wards or rooms are one step toward the solution of the problem.

(*b*) Maternity wards in general hospitals should be separated from other wards in order to guard against the possibility of infection.

(*c*) The provisions for hospital care for maternity are quite inadequate, being almost unknown outside of the large cities.

5. Infant welfare stations and children's health centers. (See Minimum Standards for Child Welfare, p. 7.)

(*a*) Children may be brought to these centers for periodic physical examination by physicians, who also instruct the mothers as to proper methods of feeding and general hygiene.

C. Measures for the protection of mothers and infants—Continued.
5. Infant welfare stations, etc.—Continued.
(*b*) The cases are followed up and the instruction carried out in the homes by the public health nurse. (See Topic III, C, 1.)
(*c*) There may be separate centers for infants and children of preschool age, or the work may include all children under school age according to the size of the community and the accommodations offered.
(*d*) The activities of the center may include the distribution of milk, and classes for instruction in the preparation of food, the care of children, general hygiene, sewing, and other pertinent subjects.
(*e*) These centers are almost universally found now in large cities, and are gradually being developed in small cities, towns, and rural districts.
6. Milk depots.
(*a*) In some communities, milk depots or stations are maintained for the distribution of properly qualified milk to babies and little children. Such distribution may very well be a part of the work of infant welfare stations and health centers.

D. Measures adopted in the United States for the public protection of childhood to be enforced through Federal and State Governments.
1. Compulsory education. (See Section VI, Outline 4, B.)
2. Restriction of child labor. (See Section VI, Outline 4.)
3. Provision for physical examinations.
(*a*) Periodic physical examinations of school children are required by law in a number of States.
(*b*) In 18 States the law requires a child to be examined by a physician before he can be granted an employment certificate; in 10 the requirement of such an examination is optional with the certificate issuing officer. In some States temporary certificates only are issued to children with remediable physical defects, or certificates are refused entirely until such defects are corrected. (Jan. 1, 1921.) (See Section VI, Outline 4, C, 1.)

D. Measures adopted in the United States, etc.—Continued.

4. Medical inspection in schools. (See Section III, Outline 1, Topic VI.)
   (*a*) In certain States school physicians have constant supervision of the children in school and report physical conditions in need of treatment to parents and school nurses are employed for follow-up work.
      (1) Seventeen States have mandatory laws, State wide or local in their application, regulating medical inspection.
      (2) Twenty-one other States have permissive laws only.
5. Children's clinics.
   Dental clinics, nutrition clinics, clinics for the treatment of the eye, ear, nose, and throat, venereal diseases, and other forms of disease or defects are established in various cities.
   (*a*) Such clinics may be connected with schools, hospitals, or social agencies.
   (*b*) The work consists in the treatment of sick children and performing minor operations.
   (*c*) The remedying of minor defects and the treatment of minor ills in childhood is important in preventing serious ill health later. (See Section III, Outline 2.)
6. Children's hospitals.
   (*a*) Certain States maintain hospital beds for children.
   (*b*) Hospital care of children in need of surgical and medical treatment is provided in many cities.
   (*c*) The improvement of hospital care for rural districts, especially the development of the county hospital system, is much needed. (See Section III, Outline 5, Topic III, G.)
7. Day nurseries.
   (*a*) These are usually maintained by private funds for the purpose of caring for the children of mothers who must be away from home during the day.
   (*b*) In some places they are inspected and licensed and thus held up to certain standards.

D. Measures adopted in the United States, etc.—Continued.

7. Day nurseries—Continued.

(*c*) The better ones carry out health programs, supervise the play of children, and through home visiting better the conditions in the homes from which the children come.

Provision for dependent, neglected, defective, and delinquent children. (See Section VII, Outlines III and IV.)

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CHILD MENTALITY AND MANAGEMENT

SECTION IV.—CHILD MENTALITY AND MANAGEMENT.

OUTLINE 1. INFANCY (BIRTH TO 1 YEAR).[1]

The first year of life is a period of exceedingly rapid acquisition. Though the rate can not be measured, it is perhaps true, as has often been said, that human beings learn more during the first year than in any other equal period of time. The child is born with the capacity of receiving sensations from all of the sense organs, but without any established relations whatever between one sense impression and another. His world thus contains no objects, no persons, no spaces or distances, but only lights, sounds, tastes, warmth, cold, pressure, and colors, all unrelated to one another and scarcely set off against one another as separate elements of experience. He also has the power to move various parts of his body, but no power to control the movements, or to relate them to sense impressions. By the end of the first year he has mastered and made automatic both the power to perceive the world about him and the power to control a wide variety of bodily movements. The process by which this change from a mere matrix of experience to an ordered usable world comes about constitutes an interesting study. While the relating of sense impressions to one another and the increasing control of bodily movements are constant elements in a unified process, nevertheless during the first six months the stress of the child's interest and attention falls on his sense perceptions (lights, sounds, sensations of touch and taste), while during the second six months it falls on movements and the manipulation of objects.

I. MOTOR DEVELOPMENT AND ACTIVITIES.

A. First six months.

An infant is born with a strong impulse to motion in all parts of the body and a few instinctive responses (pattern reactions). The order of acquisition of motor control is as follows:

1. Eyes.
   - (*a*) At 2 to 3 weeks of age the eyes are held fixed on bright stationary objects.
   - (*b*) At 3 to 4 weeks the eyes are turned back and forth from one object to another.

[1] The statements in this outline are based on "The Biography of a Baby," by Millicent H. Shinn, and unpublished notes of the author on her own child. The two infants referred to, both girls, developed at about the same rate and represent rather rapid progress. Variations from these types, of course, occur normally. Boys are somewhat slower than girls.

A. First six months—Continued.

1. Eyes—Continued.
   - (*c*) At 4 to 5 weeks the eyes follow very slowly a moving object.
   - (*d*) At 7 to 8 weeks the eyes are accommodated to distance.
2. Mouth, head, and trunk.
   - (*a*) At 3 to 4 weeks the child seizes the nipple with his lips (the mouth is the first organ of touch and exploration).
   - (*b*) At 7 weeks the lips and tongue are used for exploring.
   - (*c*) At 7 to 8 weeks the head is held up, but is very wobbly at first.
   - (*d*) At 8 to 9 weeks the back is straightened. He can now look around when held upright.
   - (*e*) At 10 to 12 weeks an effort is made to sit up.
   - (*f*) At 20 to 24 weeks he sits alone.
3. Hands.
   - (*a*) At 8 to 9 weeks the child touches his hands together.
   - (*b*) At 9 to 10 weeks he voluntarily puts his hand to his mouth.
   - (*c*) At 12 weeks he begins to suck his thumb (the thumb is seized by the mouth).
   - (*d*) At 12 weeks he explores objects which his hands happen to touch (the objects are not looked at).
   - (*e*) At 16 to 19 weeks, reaching and grasping are developed. The movements at first are vague and clawing. (The child at this stage appears ambidextrous. Both hands are used together.)
   - (*f*) At 20 to 22 weeks he holds objects in his hands to look at before putting them into his mouth.
   - (*g*) At 26 weeks he picks up objects accurately, and often with one hand.
4. Feet and legs.
   - (*a*) At 8 to 9 weeks the child begins to push hard with his feet.
   - (*b*) From 12 weeks on, this pushing develops into jumping, if he is supported with the feet touching the lap.
   - (*c*) From 14 weeks on, rhythmic jumping in response to music—"dancing"—begins.

B. Second six months.

The world of perceived objects is now sufficiently well developed to serve as a basis for motor responses. Conscious interest is in the motor response, rather than in the development of sense perception which results from the activity. Coordination of eyes, hands, body, feet, and legs advances rapidly.

1. Mouth, head, and trunk.
   - (*a*) At 6 months the child learns to put his toe into his mouth by grasping the ankle with both hands and pulling (this was practiced every day by one child).
   - (*b*) At 7½ months he can get up on his hands and knees; can sit alone for some time if placed sitting up, and can roll over.
   - (*c*) At 8 months he can bring himself to a sitting position.
   - (*d*) At 8½ months he can lie down and sit up at will. He now begins to creep.
2. Hands.
   - (*a*) At 6 months imitative movements are begun, such as slapping the hands on the table after seeing an adult do it (such movements, however, are not marked at this age). Objects are picked up, shaken, explored, and put into the mouth.
   - (*b*) At 9 to 10 months the hands are very active. The child loves to open and shut lids, to pull things out of boxes and drawers, and sometimes to put them back.
   - (*c*) At 11 months right-handedness becomes evident.
   - (*d*) At 11 to 12 months imitation is well developed. He tries to comb his hair, put flowers into a vase, and mark on paper.
3. Feet and legs.
   - (*a*) At 6 months the child pushes his body forward with his feet when placed on his hands and knees.
   - (*b*) At 7½ months, if laid on his back, with his legs free, he throws his legs upward, then brings them down hard (this movement is often repeated until it becomes very violent exercise).
   - (*c*) At 9 months he pulls himself to a standing position, and can stand steadied by one hand.

B. Second six months—Continued.

3. Feet and legs—Continued.

(*d*) At 9¼ months he can stand alone without support.

(*e*) At 9¾ months he can edge along by a chair and can climb upstairs, crawling from step to step.

(*f*) At 10½ months he can walk by shoving a chair or baby cab.

(*g*) At 11½ months he can take a few independent steps.

(*h*) At 12 months he can walk.

II. SENSORY AND MENTAL DEVELOPMENT AND INTERESTS.

A. First six months.

The child is born capable of receiving sense impressions of all senses, but these impressions are originally unrelated in the infant's consciousness. An unorganized matrix of experience exists.

1. Vision. (See Topic I, A, 1.)

(*a*) At 10 weeks control of the eye muscles is mastered. The child begins to know faces.

(*b*) At 12 weeks there is undoubted recognition of faces.

(*c*) At 12 to 13 weeks objects are clearly perceived.

(*d*) At 13 weeks he looks for an object which has disappeared.

(*e*) At 16 to 19 weeks a visual object is reached for.

(*f*) At 16 to 24 weeks great interest and enjoyment are taken in visual perception. An eager survey of the "world" is made.

2. Hearing.

(*a*) At 1 to 3 days there is a reaction to loud sounds as soon as the ear is free from obstructions.

(*b*) At 4 weeks attention is paid to sounds, such as chords on the piano.

(*c*) At 7 weeks there is intense interest in chords. The child often stops crying when hungry to listen as long as 10 minutes.

(*d*) At 7 weeks he smiles in response to the voice and nodding head.

(*e*) At 12 to 13 weeks he turns to look in the direction of the sounds.

(*f*) At 16 to 17 weeks experiments are made in producing sounds.

(*g*) At 21 weeks he laughs at an explosive sound, such as that made by snapping a towel.

B. Second six months.

Through the activity and use of sense perception, which is now acquired, the child adds to his knowledge about people and objects. Considerable power of attention is displayed during this period. The child may become so absorbed that it is difficult to distract him. Periods of such attention sometimes last half an hour or more. Perceptions become somewhat more rapid.

1. At six months.
   - (*a*) The child takes great interest in watching things fall, then in purposely throwing them down.
   - (*b*) He recognizes the sight of his baby carriage and his mother with a hat on, interpreting these perceptions as meaning that he is going out.
   - (*c*) An intense interest in animals is shown at this age.
   - (*d*) He knows his own name and looks when it is spoken.
2. At 7 months names of the family are recognized.
3. At 8½ months the meaning of "no-no" is known.
4. At 9 months a few words are known.
5. At 10 months several sounds with meanings are made; one, to call attention; one, of negation; one, of desire.
6. At 11 months.
   - (*a*) Eighty-four words are understood: 51 names of people and things, 28 action words, and 5 modifying expressions. (See Shinn, p. 236.)
   - (*b*) He knows the meaning of simple command.
7. At 12 months mild punishment is understood and profited by.

III. EMOTIONAL DEVELOPMENT AND TYPES OF REACTION.

Fear, rage, and love are the probable types of emotion at birth. This subject is, however, much in dispute (see Watson, p. 169–172). During the first six weeks the stimuli to emotion are those that are immediately associated with the experiences of the child; at seven weeks, more remote stimuli begin to take the place of the earlier ones. After six months emotions are sometimes called forth not merely by immediate experiences, but by the perception of objects which stand for these experiences (conditions reflexes). In some infants emotions related to social responses appear at this period.

A. First six months.

1. Fear.
   - (*a*) At 1 to 6 weeks a convulsive reaction to loud sounds often occurs.

A. First six months—Continued.

1. Fear—Continued.

(*b*) At 12 to 16 weeks the child shows signs of fear on seeing strangers.

2. Rage.

(*a*) At 1 to 6 weeks the child struggles and cries if held so that free motion is impeded.

(*b*) At 12 to 16 weeks he may cry and grow stiff if compelled to lie down when he wishes to sit up.

3. Love.

(*a*) At 1 to 6 weeks the child smiles and shows signs of contentment when touched on the lips.

(*b*) At 7 weeks he smiles in response to the voice and nodding.

(*c*) At 8 weeks and following he shows signs of pleasure in looking at new objects.

(*d*) At 12 to 16 weeks he laughs aloud when played with (rumpled and tossed gently).

(*e*) At 21 weeks he laughs aloud at explosive sounds, accompanied by sudden motion.

B. Second six months.

1. At 7½ months the child shows signs of great joy at the sight of his baby cab or his hat.
2. At 8 months he may hang his head and show signs of embarrassment when his attempts to make sounds are imitated. He often refuses to continue.
3. At 8½ months he shows unwillingness to be picked up by strangers—probably fear.
4. At this age he cries to go to his mother at the sound of her voice and cries at not having her undivided attention.
5. At 8¾ months he cries repeatedly when laughed at.

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OUTLINE 2. THE PRESCHOOL CHILD (1 TO 6 YEARS).

The time between 1 and 3 years is a period of exploration of the outside world. The child is fascinated with handling objects, with exploring new places, and getting new impressions. He often displays intense joy over a new experience, such as the new lights and sounds of a railroad station at night. Knowledge of the nature of the everyday world of objects is fairly complete at 3 years. While acquiring a knowledge of the outside world, the child learns to set himself off against it as a person. Since the most interesting and important part of his world consists of other people, his mother, father, nurse, brothers, and sisters, he also establishes simple types of social reactions. During the second part of the period, from 3 to 6 years, children develop concepts of the outside world dealing with time and space. Rough standards of measurement are acquired. The period is one of great importance in the development of character and personality. The child acquires a distinct individuality and modes of behavior which are significant for future life.

I. MOTOR DEVELOPMENT AND ACTIVITIES.

A. From 1 to 3 years.

1. Feet, legs, and trunk.
   - (*a*) At 18 months the process of walking is usually perfected, though sometimes not until 2 years. (Later development than this means that there is some type of defect, physical or mental.)
   - (*b*) Soon after walking, the child learns to sit down on a chair.
   - (*c*) At 18 months on, rhythmic motion in response to music (dancing) is well developed.
2. Hands.
   - (*a*) At 14 to 16 months, the child can put a spoon into his mouth.
   - (*b*) At 14 months on, he can carry objects back and forth.
   - (*c*) At 17 months, he can roll a doll cab.
   - (*d*) At 18 months, he can eat with a spoon without much spilling and can hold a glass with both hands and drink from it.
   - (*e*) At 18½ months, he begins to cut with scissors.
   - (*f*) At 1 to 2½ years, he shows great and continuous interest in manipulating objects. He is able to open and shut lids of boxes and pull objects out of boxes and drawers.
   - (*g*) At 2 years, he can build with blocks.

A. From 1 to 3 years—Continued.

3. Body functions.

(*a*) At 18 months, bowels and bladder are generally controlled. (Bladder control, especially in boys, may not be fully acquired until considerably later. Control of bladder at night is frequently not acquired until 3 years.)

4. Play.

(*a*) At 15 months, the child can play "go to market" with a basket and hand bag.

(*b*) At 18 months, he plays "pouring coffee" with doll dishes, dusts and wipes the floor, washes the doll's face and hands, and marks with a pencil.

(*c*) At 2½ years, he impersonates an animal or another person (a child of 2½ years, playing that she was a mother, addressed her own mother as "grandmother").

B. From 3 to 6 years.

The voluntary movements at this age become more accurate and more rapid.

1. Feet, legs and trunk.

During this period, the child loves to climb trees and ladders, to practice jumping, hanging by the hands, walking narrow boards, etc.

(*a*) The play at this age is largely in the form of make-believe.

(*b*) The dramatic instinct is well developed. The child loves to act out stories.

(*c*) He plays all the adult activities he has a chance to observe.

(*d*) He loves to repeat the same game in exactly the same way, again and again, just as he loves to have the same stories read, over and over.

(*e*) The play during these years tends to be solitary, or with adults. Very little ability to play with other children of the same age is shown until the end of this period (5 or 6 years). Kindergarten marks the transition to group activities.

2. Hands.

(*a*) At 3 to 4 years, the child can dress and undress.

(*b*) At 4 to 5 years, he can brush his teeth.

B. From 3 to 6 years—Continued.

2. Hands—Continued.

(*c*) At 4 years, the mastery of scissors is attained, and he can follow an outline roughly with a brush, or pencil.

(*d*) At 4 to 5 years, people and objects are drawn, and at times scenes. (A girl of 5 years drew a picture of a dead soldier buried under a hill in France, with his family climbing the hill to place flowers on it.)

II. SENSORY AND MENTAL DEVELOPMENT AND INTERESTS.

A. From 1 to 3 years.

At this age perceptions develop rapidly. New properties of objects are discovered through incessant handling, tasting, feeling, and looking at everything within range.

1. Comparison of objects.

(*a*) At 15 months the child deliberately compares his own hand with that of his mother, his doll, etc.

2. Recognition of pictures.

(*a*) At 14 months the child recognizes photographs of members of the family.

(*b*) At 17 months, after seeing a picture of a child in bed, he runs to pat his own bed, jabbering excitedly.

(*c*) At 18 months he can find a picture in a book on hearing its name or rhyme which refers to it.

(*d*) At 19 months he can point out hair, eyes, etc., in pictures.

(*e*) At 2 to 3 years great delight is taken in looking at pictures and hearing simple stories about them.

3. Acquisition of spoken language.

The time at which the child speaks is preceded by a period of several months (varies widely) in which many words are understood, but few, if any, are spoken.

(*a*) Order of acquisition.

(1) The order in which words are acquired depends on the child's interests and activities. He learns rapidly words which are cues to action. The wider the range of activities furnished the more he learns.

A. From 1 to 3 years—Continued.
3. Acquisition of spoken language—Continued.
(*a*) Order of acquisition—Continued.
(2) He first learns the names of persons, then objects, then action words, and finally qualifying words (big, hot, etc.).
(3) Color words are learned late, because for most children they are not cues to action.
(*b*) Rapidity of acquisition depends on:
(1) Native ability and absence of special defect.
(*a*) Bright children learn faster than dull ones.
(*b*) Deafness or malformed vocal organs retard speech.
(2) Variety of experience.
(*a*) The child's mind must differentiate an object or idea by a distinctive reaction toward it before he can designate it with a name.
(3) Amount the child is talked to.
(*a*) Children of silent mothers, or children in institutions learn slowly.
(*c*) Age of acquisition.
(1) At 14 to 18 months (sometimes earlier) single words often carry the meaning of a sentence.
(2) At 18 months most of the common words of everyday living should be understood.
(3) At 18 months to 2 years phrases and very simple sentences are used.
(4) At 2 to 3 years sentences in complete form are used. Rhymes and stories are memorized. (A child of 2½ years knew five of Stevenson's poems.)
4. Attention and self-direction.
(*a*) At 2 to 3 years, a child is capable of interesting himself by the hour, if a variety of objects is furnished. Often interest in one activity is maintained for from half an hour to an hour.

B. From 3 to 6 years.

This is a period of acquisition of general concepts of the external world.

1. Standards of size and shape.
   (*a*) At 4 years, a child can fit a round block into a round hole; a square block into a square hole, etc., without trial (this can not be done up to this age).
2. Standards of number and time.
   (*a*) At 4 years, a child can count to 10 (sometimes to 20, or even 100).
   (*b*) At 3 to 4 years, concepts of time are very vague (yesterday and to-morrow; and breakfast, dinner, and supper are confused).
   (*c*) At 4 to 6 years, a child has correct concepts of past and future, and of morning and afternoon, but very vague concepts as to weeks, months, and years.
3. Symbols.
   (*a*) At 5 to 6 years, many children get the idea of printed words as being symbols of objects and ideas, and even make an attempt to read (very superior children frequently read at 5 years, and should be allowed to learn if they wish).
4. Understanding of narrative.
   (*a*) At 5 to 6 years, if not before, a child likes to be read to. He wants the same story read over and over until it is memorized and he objects to a variation of a word (probably because he understands only part of the content at first). (A girl of 4½ years wanted "Alice in Wonderland" read to her 20 times in one winter. She knew pages of it by heart.)
5. Reasoning.
   (*a*) At 4 years, very accurate, logical thinking within the child's range of concepts takes place. (A girl of 4 years asked: "Is Mr. Hoover a fairy?—Well, then, how does he tell everybody every place what to do?")
   (*b*) At 4 to 6 years, an interest in philosophy and religion develops. The child is intensely interested in origins and ultimate concepts (God, the universe, etc.). (A girl of 4½ years

B. From 3 to 6 years—Continued.

5. Reasoning—Continued.

who had had no religious instruction reasoned as follows: "Do you know everything? Does daddy? Well, the world must know everything.")

(*c*) At 4 to 6 years, an interest in sex is usually expressed as part of a general interest in origins. (Such questions as, "Where do babies come from?" etc., are common.)

6. Ideas of truth.

(*a*) At 4 years, ability to distinguish between dreams and realities develops.

(*b*) At 5 to 6 years, the child can distinguish between an imagined event and a real past event. (Many so-called children's lies of this period are due to imperfect discriminations.)

7. Memory.

(*a*) At 5 to 6 years, memory as distinct from imagination develops. (The first permanent memories date back to this period. They are apt to be of single, vivid experiences.)

III. EMOTIONAL DEVELOPMENT AND TYPES OF REACTION.

A. From 1 to 3 years.

This is a period of very vivid, spontaneous emotions. Control of the emotions, particularly of anger and ill temper, can and should be learned.

At first the child is not clearly set off from his world. All of his emotions are attributed to his immediate surroundings—toys, animals, and even objects. Later a variety of social emotions appear.

1. At 1 to 2 years, if not earlier, tantrums are likely to occur (a child of 14 months kicked, screamed, and became rigid when removed from the bath).
2. At 13 months, the child rocks a doll (a child of 18 months would rock a razor strop, or even a "Kiddy-kar").
3. At 18 months, he feeds the doll and shows sympathy for the chair which has been knocked over.
4. At 17 months, he shows embarrassment at failure to pronounce words correctly.
5. Jealousy, sensitiveness to ridicule, resentment, and a desire to please develop during these years. (A child of 3 years would eat everything in her bowl when told

A. From 1 to 3 years—Continued.

5. Jealousy, etc.—Continued.

that her toy kitty loved to see empty bowls. A child of 4 years would eat all the scraps on her plate when told that Mr. Hoover did not like to have her leave scraps. After a great effort she remarked, "Mr. Hoover will like me yet.")

6. At 2 years, generosity and a desire to share pleasures appear.

B. From 3 to 6 years.

1. Contrariness.

(*a*) During this period the child becomes definitely conscious of his personality and sets himself off against the world.

(*b*) Many children pass through a period of being contrary. They deliberately try to see how far they can safely defy adults.

2. Suggestibility.

(*a*) The child is particularly susceptible to suggestions at this age. It may be either positive or negative.

(*b*) At 3 to 4 years, he often responds more readily to negative than to positive suggestion. (A child of 4 years refused to eat rice when she was urged, but just afterwards cried for it when told she could not have it.)

(*c*) His character is moulded for good or bad, according to his surroundings.

(*d*) His type of social response and emotional reaction is definitely determined by the attitude which adults take toward him.

3. Enjoyment in secrets.

(*a*) At 4 to 6 years the child shows enjoyment in secrets. This is due to a dawning realization that the content of his consciousness is not immediately accessible to other people, but is his only.

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OUTLINE 3. TRAINING AND MANAGEMENT OF THE INFANT AND PRESCHOOL CHILD.

The great prerequisite for wise training and management of a child of any age is sympathetic understanding of the child and his point of view. One should ask constantly: "What is the child experiencing? What is he thinking about? What is he trying to do?" Never manage a child primarily with reference to the effect he produces on adults. Too often the "good child" is one who does not trouble adults, and the "bad child," one who does. During this period a child develops a personality and habits of thinking and feeling which are of permanent importance. His habits of truth telling, obedience, and general consideration for other people should be firmly established. Elementary ideas of sex and of philosophy and religion are formed. Many children are ready to begin their course of formal instruction in knowledge by the latter part of this period.

I. THE INFANT (BIRTH TO 1 YEAR.)

(See Section I, Outlines 7 and 8.)

Health is of first importance in infancy. Strict rules as to sleep, feeding, body care, and exercise should be observed. The formation of regular habits in this period is the foundation for orderly behavior later on.

A. Feeding and body care. (See Section I, Outline 7, Topics IX–XII; Section I, Outline 8; Section II, Outlines 2, 3, 4, and 5.)

1. Breast feeding, if possible, for the first six months of life, is of the utmost importance in establishing the health of a child.
2. Feeding of a young infant should be carried out, if possible, under the direction of a competent physician. If skilled supervision is not obtainable, a mother should follow carefully a good book on the care and feeding of infants. (See Bascom and Mendenhall.)
3. An infant should be fed at regular intervals and waked in the daytime to be fed. The feeding interval should be either three or four hours at the start; after the fifth month, the four-hour interval is better for all babies.
4. If bottle feeding is necessary, it should be prepared from a physician's formula.

A. Feeding and body care—Continued.

5. It is very important to learn the correct technic in preparing artificial food, and in caring for the bottles and utensils used.
6. A daily bath in warm water is necessary for health and comfort.
7. The training of the bladder and rectum should be begun during this period.
8. Learning to manage a baby's clothing and covering so that he is always just warm enough, neither chilled nor overheated, is very important for health and in establishing good habits of sleep.
9. Out-door airing, or sleeping out of doors, is a necessary part of the daily program of every infant.

B. Sleep. (See Section I, Outline 8, Topic VII.)

1. Regularity of sleep and a sufficient amount of sleep are essential to health and behavior. Sleep is almost as important an item in a young child's régime as food.
2. Train an infant to sleep at night and have his waking period during the day.
3. Leave an infant alone at night, except for necessary feeding.
4. Never hold him or play with him at night.
5. Let him "cry it out" (within reasonable limits), if necessary.

C. Activity and exercise.

1. Holding and carrying the child.
   (*a*) Every child at 1 month on should be held, carried around, played with, and talked to each day.
   (*b*) The time should be gradually increased from a few minutes at a time, twice a day, to half an hour or more.
   (*c*) Infants differ greatly in the amount of stimulation which is good for them. Nervous excitability, or placidity, characteristic of the individual, appear at this time. An overstimulated infant is apt to have fits of prolonged nervous crying.
   (*d*) Let an infant alone, if he is happy. "Never needlessly interrupt a baby's staring, lest you hinder the development of power of attention." (Shinn, p. 61.) (See Section IV, Outline 1, II, B.)

C. Activity and exercise—Continued.

2. Holding the head up, using the hands, sitting up, standing, etc.

(*a*) An infant should be helped to hold up his head by holding him in an upright position; to use the hands by supplying things for him to handle, etc. "To wait until he knows how to grasp before giving him things to practice on, is like keeping a boy out of the water until he knows how to swim." (Shinn, p. 105.)

(*b*) As soon as he can sit up and use his hands, he should be supplied with appropriate toys and let alone so long as he is contentedly amusing himself. To interrupt him injures his power of attention and of sustained activity (this principle holds throughout childhood).

II. THE PRESCHOOL CHILD (1 TO 6 YEARS).

(See Section II, Outline 1, Topic VII, C, D; also Outline 5, Topics, III, IV.)

A. Control of bowels and bladder.

1. Training must be begun during the first year by noting the time of bowel and bladder movements and putting the child on the stool at the right time.
2. A temporary limited use of suppositories in training regularity of bowel movements is legitimate.
3. Every child should have the idea of using the toilet at 1 year, and should be fairly well trained at 18 months. Boys take longer to train than girls.
4. Approval and praise for making wants known is the best method.
5. Mild punishments such as scolding, can be used at 1 year on (the child should be made to sit on the toilet on frequent occasions until results are accomplished).

B. Commands.

1. As soon as it is made certain that the child understands commands, be sure to distinguish between suggestions as to what he may do and commands as to what he must do.
2. Make the commands few and simple, but see that they are carried out (frequent or unreasonable demands develop a contrary, ill-tempered child).
3. Be consistent. Do not allow at one time a thing which is forbidden at another.

C. Obedience.

1. The habit of obedience should be firmly established at 2 years, or, at the latest, 3 years. (The observance of the proper health habits during the first two years, such as sleep, food, bathing, and exercise, demands obedience and is an important factor in the training of a child.)
2. Begin at 1 year, or a little before, to teach the meaning of "No-no," "That is mother's," "Don't take," etc.

D. Self-control.

1. Self-control is taught incidentally with obedience.
2. Most children have tantrums at or before 2 years. These should be stopped immediately. Leaving a child in a tantrum absolutely and severely alone until he is over it is a good method.

E. Emotional reactions.

1. Fear.
   (*a*) Never allow a child to be frightened.
   (*b*) "Bears and bugaboos" may cause intense fright which will leave traces for life.
   (*c*) Many unaccountable reactions of fear and aversion can be traced to experiences which were not frightful in themselves and which at the time of telling did not frighten the child.
2. Cooperation.
   (*a*) Do not fight with a child if it is possible to avoid it. Get his cooperation instead.
   (*b*) Kindly, sympathetic treatment tends to make a sweet-tempered child. Young children are very responsive and cooperative.
3. Suggestibility.
   (*a*) Never criticize a child in his presence. A young child is very suggestible.
   (*b*) If he hears you say he is bad, he believes it, and is bad.
   (*c*) If he hears you say he can not sing, he believes it and does not learn to sing, etc.
   (*d*) Many so-called special disabilities in later life can be traced to such causes.
4. Pride in being good.
   (*a*) Praise for the good goes much further than blame for the bad from infancy on.
   (*b*) If you praise a child for being good and tell some one else how good he has been, he is good.

E. Emotional reactions—Continued.

4. Pride in being good—Continued.

(*c*) Fits of excessive pride in righteousness may occur (at 4 to 5 years), but they do no harm.

F. Play.

1. This is a period of solitary, individual play.
2. Keep the child happily occupied. Give him something to do and change it when he tires of it. Do not leave an infant to fret for want of occupation.
3. The adult must furnish the proper materials at the right time and make suggestions. (Repeating the tasks of the adults of the family is a constant source of entertainment to children at this age. Dusting, sweeping, preparing vegetables, cooking, using tools, and the care of flowers or pets, amuse the child and may prove a valuable form of instruction.)
4. The great educational possibilities of the period should be realized through play.
5. A "play school" managed on the principle that play is education is excellent at 2 years on.
6. The desire to impersonate—the dramatic instinct—is strong and should be used educationally.
7. Skill and resources are needed to make the wisest use of the time of the child from 2 years on to kindergarten or school age.

G. Instruction.

1. Definite instruction during this period is desirable.
2. Planned and supervised play, including dramatics, is the best instrument of instruction.
3. Group activities of the kindergarten type are suitable at 5 years, or somewhat earlier in the case of children who develop rapidly.
4. Superior children of 5 often learn to read, to master simple number combinations, and even the elements of geography (one child of 5 could not only put together a dissected map of the United States, naming every State, but could tell the individual States blindfolded by feeling the pieces).
5. Children who are interested in reading and numbers, should be helped to master them. An hour a day of instruction wisely given accomplishes marvelous results.

H. Truthtelling.

1. Respect for the spoken word, and the importance of being able to believe a person must be taught at this period.

H. Truthtelling—Continued.

2. Care must be taken not to corner an imaginative child or scare him into lying to escape the result of mischievous behavior or some slight misdemeanor on his part. Children may easily be made afraid to tell the truth.
3. The adult must be sure to distinguish between untruths which are mere failures to distinguish imagination or dreams from reality, or mere joy in making up stories from intention to deceive. Only intention to deceive for the sake of obtaining an end should be punished.
4. Deceit is almost sure to appear between 3 and 6 years, if not before. The child should be made to feel as much social disapproval as possible. Corporal punishment for lying does little good.
5. Strict truthtelling on the part of the parent is the most efficacious training.

I. Training in sex.

1. Questions about the origin of babies and animals are usually asked in the latter part of this period and should be truthfully but simply answered, if the questions are prompted by a real desire to know and are not the frequent idle questions of this period.
2. All irritations of sex parts should be carefully avoided. Every attempt should be made to prevent the child from handling the sex organs. Circumcision of boys is often necessary.
3. The child should be taught to get up as soon as he wakens and should go to bed too tired to stay awake long.

K. Religious training.

1. Some formal instruction in religion is wise.
   (*a*) Children of from 4 to 6 years of age are interested in religious and philosophical ideas.
   (*b*) The first crude theories of the universe are formed.
2. All questions pertaining to religion and philosophy should be answered as truthfully and as adequately as possible.

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OUTLINE 4. THE SCHOOL CHILD (6 TO 12 YEARS).

This is a period characterized by acquisition of motor skill and of knowledge of the world. Children of this age should learn as wide as possible a variety of motor activities—swimming, dancing, skating, tennis, bicycle, horseback riding, playing musical instruments, drawing, and using tools. Such complex habits are more easily learned than in later years and are apt to reach a higher degree of perfection than if they are begun later. Children of this age do not mind the tumbles and indignities incident to learning. On the mental side the period is one of acquiring the foundations of knowledge in many fields. Memory, rather than original thinking, is the dominant intellectual activity. Few new theories are formed. Children of this age accept religious doctrines from adults, and are not apt to be critical of them. Sex knowledge is sure to be acquired and wise instruction is essential now if not earlier.

His relation to others of his own age and group, rather than his relation to adults, becomes the important element in the child's social life. Group activities and group rivalries absorb his interest. Adult direction of these group activities is necessary.

It is possible during this period to form a judgment as to the permanent level of ability of the child, and his special abilities and disabilities, which gives a basis for educational guidance.

I. MOTOR DEVELOPMENT AND ACTIVITIES.

Slow, steady increase of motor control, of rapidity and accuracy of movement and endurance take place. (Compare ball throwing at 6 and 12 years.)

A. Complex motor habits.

1. Skilled use of the hands, feet, legs, and body acquired on the basis of motor control established during the previous period.

A. Complex motor habits—Continued.
   2. Swimming, riding a bicycle, skating, tennis, writing, sewing, and the use of tools are learned.
   3. Ease of learning depends in part on the degree of bodily control already acquired, and in part on the stimulus and opportunities offered.
   4. Such activities are never so easily learned or so thoroughly acquired later.

B. Standards of behavior.
   1. The child is still imitative. He conforms easily to standards of behavior which surround him and is not critical of them.
   2. Habits of personal hygiene, of politeness of speech, and of everyday behavior are formed and are hard to change later.
   3. Formation of such habits is influenced by ideals of conduct which the child readily acquires from a teacher, from a companion who is a leader, or from heroes of fiction.

C. Cultural habits.
   1. Beginnings of a technic in music, drawing, etc., should be laid.
   2. Marked talent in this direction often appears. All children should be tried.

II. SENSORY AND MENTAL DEVELOPMENT AND INTERESTS.

No new capacities appear. Formal education in groups is the chief concern of the period. A large amount of information is acquired. The general mental level of the individual can usually be determined at this time. Special abilities and disabilities become evident.

A. Sense perceptions.
   1. An ever widening acquaintance with the external world and a love of exploration marks the period.
   2. Perceptions become quicker and more adequate. The child learns to follow very rapidly moving objects.
   3. The field of perception becomes broader. More things can be perceived at once, because the perceptive world is better organized.
   4. Peripheral perception becomes developed.
   5. The child's perceptions of this period are often more accurate than those of the adult, because they are less stereotyped and less influenced by preconceptions.
   6. Perceptions become more standardized as the period advances. The child learns to ignore all but standard appearances.

B. Standards of space, time, and values.

1. The child can distinguish between right and left (6 to 7 years).
2. The meaning of north and south, inch, foot, yard, and quart, week, month, and year are understood (8 to 9 years).
3. These standards become definite only by repeated use of actual measures (not out of arithmetics).
4. In the latter part of the period the child learns to interpret spaces and times greater than those of immediate experience (1,000 years, 3,000 miles, etc.).
5. The value of money (at first small coins) is learned (6 to 7 years); later (8 to 12 years) the purchasing power of the dollar.

C. Reading.

1. Many children learn to read in the later part of the preceding period (2 to 6 years).
2. Reading is easily taught as a game, beginning with familiar words, or very simple sentences.
3. Early reading of stories is built on repetition which the child at this age enjoys.
4. Interest in reading and enjoyment of it should be maintained from the start.
5. Independent reading for pleasure should begin at 8 to 9 years.
6. Such reading should be a firmly established habit by the end of this period (6 to 12 years).
7. Learning to read should be accompanied by practice in the narration of his own experiences. This prepares him to interpret the narratives and descriptions of others.
8. Reading in geography, history, etc., is a great tool for extending the child's knowledge of the world.

D. Memory.

1. Memory becomes a dominant mental faculty.
2. It seems to improve very rapidly because of the rapid organization of the mental world.
3. An older child remembers better because he has a better developed system of ideas into which to fit new material.
4. The tendency is to depend too much on memory and not to reason.

E. Thinking.

The child at this age forms a vast number of new concepts, but does little abstract thinking (he does drill problems in arithmetic much better than original problems).

E. Thinking—Continued.

1. Science.
   (*a*) Interest is shown in nature study and simple sciences, in so far as the acquisition of facts is concerned.
   (*b*) Standards of reality and the fundamental principles of science are lacking. (The child at this age is very credulous and superstitious.)
   (*c*) Little interest is shown in scientific theory.
2. Sex knowledge.
   (*a*) Knowledge about sex is sure to be obtained during this period, as a result of curiosity about the world around him.
   (*b*) Simple sex instruction is essential.
3. Religion.
   (*a*) Religious ideas are uncritically accepted from adults.
   (*b*) New systems of thought, or philosophic or religious theories, are not apt to develop. Those developed in the period of 4 to 6 years are used.

F. Instruction.

1. Variety of instruction should be as great as possible.
2. Special capacities should be tried out—music, painting, sculpture, etc. (esthetic interests are not strong, but the fundamental basis for later esthetic interests should be laid in familiarity with materials and simple training in standards of taste).

III. EMOTIONAL DEVELOPMENT AND TYPES OF REACTION.

Definite social consciousness develops during this period. Group activities take the place of individual activities. Standards of the child's own group assume great importance and influence emotional reactions more than adult standards.

A. Obedience.

1. The child begins to understand that obedience is not mere response to the personal demand of an adult, but response to definite social laws.
2. Extreme sensitiveness to the judgment of his peers is characteristic. The tendency is to accept group standards.
3. Very real suffering is caused by any necessity for going against group standards (such as being compelled to wear different clothes or to behave differently).

B. Play.

1. Play ceases to be individual and becomes a group reaction. Group play, clubs, and societies are characteristics of the period.
2. Play becomes organized and is directed toward an end rather than for immediate enjoyment. Pleasure in obtaining the end for the group becomes dominant.
3. Play becomes competitive, as shown in group rivalries—gangs and group games in two opposing groups, and in individual rivalries—usually for group leadership.

C. Teasing.

1. Teasing is usually prompted by a desire to impress his own personality and exert power, rather than an intention to be cruel.
2. The child enjoys exerting power on his mates, rather than on objects. He shows off, teases, and insists on having whatever he sees another child have.

D. Generosity.

1. Generosity is a much more real characteristic than apparent cruelty (this was shown in the fine enthusiasm of children of this age for helping in war work. Many children gave up their spending money, or even went without lunches, to join the Junior Red Cross).

E. Sex emotions.

1. Sex emotions sometimes appear.
2. They are premature and usually caused by unwise initiation in sex knowledge.

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OUTLINE 5. THE ADOLESCENT (12 TO 18 YEARS).

The period of adolescence marks the transition from childhood to adult years. A profound readjustment of bodily and mental functions takes place. Rapid, spasmodic physical and intellectual development produces the effect of awkward, erratic movements, of unreasonable and violent likes and dislikes, of rebellion against constituted authority. Physical strength and perfection of physical control increase rapidly. The social standards and religious doctrines of adults are no longer accepted uncritically, but are subjected to searching examination and thorough individual revision. Adult leaders become less important, and leaders from the group take their place. During this period creative imagination is at work, and aesthetic interests and feelings assume a large rôle. Intense religious experiences are common in the latter part of this period. Sex becomes a prominent factor in existence. Some type of "falling in love" usually takes place. By the end of this period the adult personality emerges. (See Section II, Outline 7.)

I. MOTOR DEVELOPMENT AND ACTIVITIES.

A. Change in size.
   1. Marked changes in size and relation of the parts of the body, due to rapid growth, lead to a period of awkwardness and physical readjustment.
   2. The effect is like a reacquisition of bodily control. The child is apt to drop, break, and upset things (12 to 15 years).

B. Development of physical strength.
   1. Very rapid development of physical strength, rapidity of motion, accuracy, and rapidity of coordination occurs.
   2. Endurance and power of sustained activity are poor at the start, but undergo great development in the latter part of the period (15 to 18 years).

C. Perfection of motor skills.
   1. This is preeminently a period for the perfection of motor skills of all sorts which should have been begun in the previous period (6 to 12 years).
   2. The child can become skilled in swimming, tennis, ball playing, piano or violin technic, drawing, and pronunciation of foreign language during this period, but such skills can rarely be perfected if begun later.

II. MENTAL DEVELOPMENT AND INTERESTS.

A great expansion of intellectual interest characterizes this age.

A. Perception.
   1. The powers of perception are fairly completed at the beginning of the period.
   2. Perceptions take on the fixity of adult perception.

B. Imagination.
   1. The realm of experience is enlarged by day dreams, imaginary experiences, and tales of adventure, marked by a love of exaggerated heroes and a desire for strong contrasts and sharp outlines (things are all good or all bad).
   2. Great interest in a future career is part of this imaginative activity.

C. Memory.
   1. Memory is excellent and improves somewhat, but is not as dominant as an intellectual activity as it was in the preceding period.
   2. Interest in independent thinking assumes a greater importance than acquisition through memory.

D. Thinking.
   1. Ability to think abstractly increases rapidly.
   2. Interest is shown in the fundamental principles of science, in philosophic and ethical theories, and in religious ideas. (The child becomes critical toward them in the latter part of the period.)
   3. Love of argumentation and debating is shown, and a strong interest is taken in matters of taste (esthetics).

E. Instruction.
   1. Instruction should be as broad as possible to meet expanding interests.
   2. Mathematics, science, history, civics, literature, languages, and the arts should all be included to some extent for every child.
   3. Sex instruction, to meet the inevitable sex interest of this period, is essential for every child.
   4. Differences of emphasis are to be determined by the individual differences of the children—the aims, interests, and future opportunities.
   5. Special inaptitudes for a given subject should be carefully investigated to find out whether they are due to real mental inabilities, or to defective early instruction and bad mental attitudes.

E. Instruction—Continued.

6. Most apparent inaptitudes are not real, and yield to proper treatment.
7. In case a real inaptitude exists, instruction in that field should not be pushed.

III. EMOTIONAL DEVELOPMENT AND TYPES OF REACTION.

Rapid and violent emotional development and somewhat defective emotional control characterize the period. Group activities are important, but they dominate much less than in the previous period. Individuality is emphasized.

A. Exaggerated emotional responses.

1. Loathing human beings. They seem like animals (this feeling is apt to be produced by a sudden realization of the physiology of sex).
2. Disgust at seeing people enjoy food.
3. Food dislikes and eccentricities.
4. Great love for or dislike of certain rooms, places, or objects.
5. Slang abuses.
6. Intense hero worship.
7. Impulse to excessive self-sacrifice.

B. Increase in self-consciousness and social consciousness.

1. Self-analysis and intense interest in his own experiences (this is apt to be carried to excess in morbid brooding).
2. Feelings of independence.
3. Feelings of intensified existence; nameless yearnings and unrest.
4. Critical and questioning attitude.
5. Clan spirit.
6. Excessive interest and sensitiveness as to what others think about him. (Trade-lasts abound.)
7. Behavior, fully moral—directed by conscious social standards.

C. Sex emotions.

1. Sex attractions and sex sensations are sure to be felt now, if not before.
2. At 12 to 15 years the sexes show consciousness of sex by avoiding one another (the period of boy and girl chums has passed).
3. At 15 to 18 years definite attraction and association with the opposite sex usually begins.
4. At this age falling in love, either with a person of the same or opposite sex usually occurs (love affairs of this period are rarely permanent).

D. Religious emotions.
   1. Religion ceases to be a habit and becomes an emotion (two-thirds of all religious conversions occur at this time; most of them during the period of 15 to 18 years).
   2. The mystery of religion appeals.
   3. Critical estimates of religion sometimes take place later in this period.

E. Esthetic emotions.
   1. Esthetic emotions appear or are intensified in love of the beautiful—in clothes, house furnishings, architecture, painting, sculpture, and music.
   2. The possibilities of esthetic enjoyment are usually fixed for life at this period.

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OUTLINE 6. TRAINING AND MANAGEMENT OF THE SCHOOL CHILD AND THE ADOLESCENT.

The training and management of school children and adolescents constitutes a problem in which community cooperation is essential. The school, the home, and the forces in the community which control recreation and social life must work in close unison. Furthermore, each child constitutes an individual problem and wise training and management is possible only when each child is made the object of careful, individual study. Correct adjustment to school is one of the vital problems of this period. Many a child fails to realize his possibilities because the school program provided for him does not fit his capacities. The work may be too hard, in which case the child not only fails in school, but frequently becomes either depressed and discouraged, or resentful, unruly, and truant. The work may be too easy, in which case the child fails to realize his possibilities of

growth, and fails to form the habits of work which are essential to success. The subject matter offered him may fail to appeal to his special aptitudes and interests.

Throughout this period the object of training should be to make the child more and more his own master. The motive of obedience in behavior should gradually give place to that of self-directed activity based on grounds which the child understands and approves. Force is sure to fail and to do harm in the management of adolescents. Example is far more potent than precept. It is of the utmost importance for parents and teachers to retain the confidence of children of this age, and to cooperate with them in the solution of their problems. Above all they must be taken seriously. Ridicule is sure to kill confidence and make it impossible to assist or guide adolescents. (See Section II, Outline 7.)

I. THE SCHOOL CHILD (6 TO 12 YEARS).

A. Adjustment to school.

This can be secured only by cooperation of the school and the home.

1. Individual differences.
   - (*a*) Individual differences should be recognized at the start. Differences of physiologic development and of mental ability should both be considered.
   - (*b*) Failure in school subjects should receive prompt attention.
   - (*c*) The school should provide a psychologic clinic to assist in determining the cause of failure.
2. Different rates of progress.
   - (*a*) Different rates of progress should be provided for different degrees of ability—that is, the inferior group, the average group, and the superior group.
   - (*b*) No child should be left in a group where he continually fails. Failure means discouragement and destruction of effort. Success and encouragement are essential factors in training a child to put forth effort.
   - (*c*) No child should be left in a group where he does not need to put forth effort. He becomes lazy and fails to develop his talents.
   - (*d*) No child should be continually criticized at school. He is subject to suggestion and soon believes that he can not succeed. Wise encouragement is far more potent than criticism.

B. Opportunity for development.
   1. Physical development during this period must be provided for by furnishing wholesome food, regular sleep, sufficient in amount (gradually reduced from 12 hours for the 6-year-old child to 9 for the 16-year-old child), plenty of outdoor exercise, and protection from physical strain or overexertion.
   2. The child learns by doing, not by having things done for him.
   3. He must be furnished with tools for activities, and leadership.
   4. He needs skates, bicycle, playground opportunities, swimming pool or pond, trees to climb, tools, books, paints, piano or other instruments, etc.
   5. The school, home, and community must cooperate to furnish this equipment.

C. Personal relations with parents.
   1. The attitude of the parent should be one of sympathetic understanding rather than a domineering one.
   2. Obedience must be maintained, but it should be done through reasonableness and an understanding on the part of the child, rather than through force.
   3. A child at this age who becomes lawless and can not be managed is sure to give society trouble later.
   4. Unruliness at this time is usually the fault of the parent or adult and dates back to mismanagement earlier.
   5. Cooperation rather than opposition meets with great success.
   6. Children learn manners and morals by imitation, rather than by precept (the parent who is polite and considerate to the child usually has a polite and considerate child).
   7. Many small misdemeanors should be overlooked and conflicts avoided, unless there is a real issue involved.
   8. Happiness is a great safeguard for a child. A happy child is apt to be a good child.

D. Play and provision for leisure time.
   1. The play of this period is naturally group play. Many playmates are more desirable than one.
   2. Group plays may have an educative value.
   3. Groups of children need adult leadership in their group competitive games, clubs, and societies—hence, the importance of playground directors, boy and girl scout leaders, and teachers to supervise civic clubs and the Junior Red Cross.

D. Play and provision for leisure time—Continued.

4. Group activities teach fair play, cooperation, and kindliness and develop leadership.
5. The standards and ideals of the group have greater weight with the child than those of the adult. Parents should understand this and respect it. (No child should be compelled to wear clothes, or to do things which expose him to the ridicule of his group, if it can be avoided.)
6. Do not destroy the gang—give it leadership and training. Children love to help and to feel useful and important. The gang makes a fine civic club or chapter of the Junior Red Cross.

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E. Work.

1. The child of this age should learn to maintain activities which are not enjoyable in themselves, but merely for the end to be attained. For instance, he should learn to master arithmetic not necessarily because he is interested in the process, but because he understands its importance as a tool in constructive work and in

E. Work—Continued.

science. He should learn to keep at work at a problem in construction, even when it becomes irksome, for the sake of the value and usefulness of the finished product.

2. Some regular duties in the household, for which the child is held responsible, are valuable. They not only establish habits of work, but develop a sense of social responsibility. The child learns that the welfare and comfort of others are to some extent dependent on his efforts.
3. It is sometimes a good thing to let children earn their pleasures and luxuries by paying them for regular tasks. It develops a sense of responsibility and teaches the value of money. Some of the money earned should be saved to inculcate thrift.

F. Sex training.

1. A wholesome and respectful attitude toward sex is of the utmost importance. No factor is more important to the life of the child.
2. Many misdemeanors and mental abnormalties in later life can be traced to early false ideas of sex and bad sex habits.
3. Sex information is sure to be obtained by children. Most of them receive it by 9 or 10 years.
4. The simple facts of sex together with an attitude of respect and idealism toward it should be taught—if possible by the parent—before the child is 9 years of age.
5. An attitude of frankness and confidence on the part of the parent is the best safeguard.

G. Religious training.

1. Formal observance of religious rites is the usual religious training of this period.
2. The child at this age takes religion as a matter of course and is not vitally concerned with it.

II. THE ADOLESCENT (12 TO 18 YEARS).

(See Section II, Outline 7.)

A. Adjustment to school.

1. Every child should be given an education within the range of his possibilities.
2. Every community should have scholarships for continued education of superiorly endowed children.

A. Adjustment to school—Continued.

3. No child should be allowed to leave school under 16 years of age. Even simple trade training requires as much education as this.
4. Every child should be given training fitting him for some type of wage earning before his education is complete. This is true whether his capacities limit his general education to the first few grades of the elementary school, or are sufficient to carry him through the highest type of college and university work. In this sense all education should be vocational.
5. Within this period a decision must be reached as to the general type of career to be chosen for each child and the kind and amount of education required. Such vocational guidance requires the cooperation of parents and teachers.
6. Every school system should be equipped with a department of vocational guidance to study occupations, study children, and conduct courses of instruction in vocations. (The child of this age is naturally interested in careers and the "life-career motive" should be used.)
7. Decision as to the kind and amount of training to be given each child should depend on:
   (*a*) Level of ability of the child.
   A permanent level of ability can usually be determined at this age by a properly qualified person.[2]
   (1) The child of very limited ability should be given training for work which can be satisfactorily undertaken by persons in the lower ranges of intelligence. Starting a child of limited ability in a course of training which is beyond his capacities is an injustice to the child It means discouragement, failure, and sometimes delinquency.
   (2) The child of average ability should be offered a course of training leading to a middle-grade occupation.
   (3) The child of superior ability should be given a longer course of general edu-

[2] At present few persons are qualified as examiners.

A. Adjustment to school—Continued.
7. Decision, etc.—Continued.
(*a*) Level of ability of the child—Continued.
cation followed by training for a profession or initiation into a managing or supervising position.
(*b*) Disposition, type of social reaction, interests, and opportunities.
(1) The wise choice of a course of training and subsequent career is a matter of the utmost importance for character and disposition.
(2) The "misfit" in school or in industry is discontented, apt to be ill-tempered, and to do rash things.

B. Opportunity for development. (See also Topic I, B.)
This is the time for perfecting all types of bodily control and technical skills. (See Section V, Outline 4.)
1. Outdoor sports (tennis, ball playing, hiking, swimming, riding, etc.).
(*a*) Are important not only for health of the body, but also for health of the mind.
(*b*) Furnish the best counteractive to brooding and to undue interest in matters of sex.
2. Technical skills (music, drawing, painting, and sculpture).
(*a*) Serve to develop technical skill at the right time.
(*b*) Tend to develop aesthetic interests which drive off emotions into safe channels.
(*c*) Provide a resource for enjoyment of leisure throughout life.

C. Personal relations with parents.
1. This is a very difficult period for most parents and children, because of violent seemingly unaccountable emotional reactions and the change from the attitude of acceptance of adult standards to an attitude of criticism and evaluation.
2. Distinct personality develops. The child sets himself off against the group, and is sure he is not understood.
3. Obedience must give way to friendly advice and personal influence on the part of the parent.
4. The adolescent must work out his own salvation, but he needs sympathetic, understanding help.
5. Vagaries of emotion and action should not be taken too seriously. Avoid ridicule of peculiarities.

D. Recreation and provision for leisure time.
   1. The club or society still remains important and should be encouraged and given assistance.
   2. Actual adult participation becomes less desired and less necessary in the latter part of the period (leaders from the group take the place of adult leaders).
   3. Social life, in the adult sense, begins in the latter part of the period.
   4. Provision for association with the opposite sex under proper supervision becomes very important.
   5. Young people of opposite sexes should not be given much time alone together at this period. Emotions are too violent and the sex instinct too untrained to make it safe. Concerts and theaters should play a part in recreation. They should be provided in programs of school and community recreation.

E. Work.
   1. The spirit and habit of work should be established at this time.
   2. The school should establish the habit of work.
   3. The child of this age should have some definite responsibility about the home.
   4. For some adolescents part-time wage earning is desirable, provided it does not interfere with school and physical development.

F. Sex training.
   1. Further sex instruction is imperative. It can often be accomplished in courses in biology.
   2. The physiology of sex and the existence of venereal diseases should be explained (15 to 18 years).
   3. The best safeguard against bad sex practices is plenty of outdoor exercise and a busy, interesting life.
   4. Sex ideals of the highest type should be inculcated through literature, the drama, and personal heroes.
   5. Early love affairs are sure to occur. They rarely prove permanent, but they should be taken seriously. They may do great good or great harm (flippancy is resented by the child).

G. Religious training.
   1. Religious training demands complete religious freedom and a sympathetic discussion of religious experiences and difficulties.
   2. Any attempts to mold religious beliefs by authority will be keenly resented and are unwise.

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(See also Section IV, Outlines 4 and 5.)

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OUTLINE 7. THE ABNORMAL CHILD.

Though actual insanity is almost unknown among children, certain pathologic conditions of the nervous system occur which entail mental disorders, and abnormalities of behavior appear which are suggestive of the possibility of future insane states. Feeble-mindedness and epilepsy are the conditions most closely related to mental abnormalities. Feeble-mindedness is an inherited and incurable state of mental inferiority. Epilepsy, while it usually is associated with mental inferiority, is sometimes found in children of normal ability. Some types of epilepsy yield to treatment. Epileptics and the feeble-minded should, as far as possible, be cared for in suitable institutions. Those who later become insane usually display as children abnormalities of behavior and types of social reaction which reveal an unstable nervous system. They are recognized as queer and somewhat unaccountable children.

Aside from these serious and hereditary types of abnormality some normal children become abnormal because of unwise educational or social treatment. Children who become stubborn, depressed, unruly, deceitful, truant, or dishonest are frequently normal children who have been spoiled by unwise management at home or at school. These children are the hopeful type of abnormal child who can often be set right by wise corrective treatment.

I. ABNORMALITIES IN MENTAL LEVEL.

A. Degree of mental ability.

Every degree of mental ability from idiocy to genius occurs in children. The curve of distribution is such as to indicate that there is a large group of children with levels below and

A. Degree of mental ability—Continued.

above normal. A rough estimate gives the distribution as follows:

1. Defective (including moron types), 3 per cent.
2. Below average, 22 per cent.
3. Average, 50 per cent.
4. Above average, 22 per cent.
5. Very superior, 3 per cent.

B. Training and management.

This should be suited to the degree of ability of the child. If it is not, abnormalities of behavior are likely to occur.

1. The defective child.
   - (*a*) The defective child becomes delinquent not because of an inherent tendency, but because he is easily influenced and often lives in a bad social environment. It is as easy to teach him good habits as bad.
   - (*b*) If of low grade, he should be cared for in an institution.
   - (*c*) If of high grade, he should be educated in a special class in which he is expected to learn very slowly the rudiments of reading, writing, and arithmetic, and also a variety of simple, useful arts (using simple tools, cooking, sewing, laundry work, house cleaning, etc.).
   - (*d*) When he is sent out to earn a living, he should be kept under the supervision of an intelligent adult (after-care committees). (See Bloomfield, pp. 27, 33–34, 54; also, Fernald.)
2. The inferior child.
   - (*a*) The inferior child who is pushed beyond his capacities realizes vaguely that he can not meet the demands made on him. He responds by stubbornness, by apathy, by truancy, or by unruly behavior.
   - (*b*) Adjustment of his academic work to his capacities and provision for concrete handwork more suited to his type of thinking often solve the problem.
   - (*c*) Membership in a social group in which he can play a part is important.
3. The superior child.
   - (*a*) The superior child who needs to make no effort to do what is demanded of him has no proper outlet for his energies and abilities. He may

B. Training and management—Continued.
3. The superior child—Continued.
become mischievous and impudent and the leader of a gang.
(*b*) More rapid progress in school, broadening the curriculum, and the proper provision for organized and supervised group activities (self-government plans, clubs, scout movements, etc.) usually solve the problem.

II. ABNORMALITIES OF BEHAVIOR IN NORMAL CHILDREN.

Abnormalities of behavior in normal children may result from the same causes which bring about abnormalities in exceptional children. In addition, such abnormalities may result from parental mismanagement and bad social surroundings. Children are imitative. They absorb the manners and morals which they see practiced, not the ones which they hear preached. Some of the types frequently met are:

A. The stubborn child.
1. Stubbornness is often the result of domineering behavior and unreasonable demands on the part of parents from infancy on.

B. The depressed child.
1. A sensitive child who has met with constant unsympathetic treatment and repression often becomes depressed (such treatment sometimes results in extreme apathy).
2. Cases of this type can be revolutionized in attitude in a few months by gradually discovering the child's interests and capacities and giving him encouragement and praise as well as suitable instruction.

C. The unruly child.
1. A child who is allowed to have his own way in infancy and young childhood, because it is the easiest thing to do at the moment, usually becomes unruly later.
2. Very inconsistent and erratic treatment, allowing at one time a thing which is punished at another, tends to make an unruly child. He knows no laws, only caprices.

D. The deceitful child.
1. A child who is systematically deceived by adults to attain their own ends is sure to become deceitful, no matter how much he is punished for lying.

D. The Deceitful child—Continued.

2. A neglected child, left to his own devices, is apt to becomes deceitful, because he finds he can attain his ends that way, and no one pays any attention to it. He is not made to feel the social disapproval which should greet the first attempt at deceit.

E. The truant.

1. Aside from school maladjustment (see Topic I B), truancy may be due to unsatisfied love of adventure, to a desire to get away from a bad, uncomfortable home, or to mental conflicts brought about by repressed sex concepts.
2. The first step in dealing with a truant is to find out the real cause of the truancy.

F. The thief.

1. A child may be a thief because his parents are not thoroughly honest; because of poverty and the need of satisfying desires which are legitimate and even imperative; because of a love of adventure and the lure of the streets; because of the undirected activities of the gang; because of the demoralization of bad sex habits; because of mental conflicts caused by the repression of sex knowledge.
2. The real cause of the stealing must be discovered and removed if the child is to be cured.

III. THE PSYCHOPATHIC CHILD.

A. Cause.

1. An unstable nervous system existing from birth. (In most cases the family history shows instances of mental disease, alcoholism, tuberculosis, or venereal disease, or several of these causes.)

B. Results.

1. The development of serious nervous and mental disorders depend on—
   (*a*) The extent of the instability of the nervous system (some children are born with nervous systems so unstable that mental disease is sure to develop).
   (*b*) The degree of stress and strain which the circumstances of life placed upon the child. (Where the instability is less, mental disorders may never appear, if the child can be protected from undue social and emotional strain.)
2. Actual insanity rarely develops in young children.

C. Prevention.
   1. Infants should be protected from undue nervous excitement. Excessive nervous crying as a reaction from activity and social stimulation is a sign for caution.
   2. Violent emotions should be avoided in young children. Fear is the most frequent harmful emotion in young childhood. If fear occurs, great care should be taken to dispel it.
   3. The proper attitude toward sex, inculcated by wise sex instruction from young childhood on, is of the utmost importance in preserving mental health (distorted ideas of sex are the most prolific source of psychopathic conditions).

D. Suggestive symptoms.
   1. The presence of unaccountable and uncontrollable impulses, such as a sudden impulse to injure another child with no provocation.
   2. Violent and unaccountable emotional reactions (depression, fear, anger, or great excitement without cause).
   3. Bad failure of the power of voluntary attention.
   4. Presence of delusional ideas.
   5. Extreme suggestibility.

E. Precautions.
   1. A psychiatrist should be consulted.
   2. A regular, wholesome kind of existence, free from strain and excitement, should be provided.
   3. Some occupation should be found which will prove interesting and not too stimulating, which will keep the mind from dwelling on self.

F. Preventive treatment.
   1. Mental hygiene clinics should be established (they should accomplish for mental disease what the tuberculosis clinic does for tuberculosis).

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PLAY AND RECREATION

SECTION V.—PLAY AND RECREATION.

OUTLINE 1. INTRODUCTION.

The word "play," in its more popular use, not only does not convey the meaning it has come to have in the minds of psychologists and educators, but even carries a suggestion antagonistic to the full significance of the word. Play is sometimes as truly serious, as much concerned with achievement, as directly influenced by ulterior motives, as difficult and heroic in practice, and as contributory to human progress as is work, which is commonly, but often ill-advisedly, contrasted to it. Play, as used in this outline, is not simply an incident in the drama of life; it is rather the thread of the plot itself.

I. SOME GENERAL FACTS ABOUT PLAY.

A. Play is serious.
   1. As viewed by the players. Illustrations may be drawn from—
      (*a*) Personal experience.
      (*b*) Literature. (See Payne, p. 128; Froebel, pp. 40–127; Sully, p. 65; Lee, pp. 1–4.)
   2. As viewed by the onlooker. Illustrations may be drawn from—
      (*a*) Personal experience.
      (*b*) Literature. (See Collier and Barrows; Rapeer, pp. 309–409; also Lee, pp. 228–246.)

B. Play is concerned with product and result. Illustrations may be drawn from—
   1. Personal experience.
      (*a*) Objectively.
         (1) Making things to use; bows and arrows, kites, boats, huts, etc.
         (2) Nutting, berrying, gathering flowers, collections, etc.
      (*b*) Subjectively.
         (1) Achievement, prestige, etc.
   2. Literature. (See Lee, pp. 246–254.)

C. Play is not pursued just for fun; it is not always simply pleasurable, but may involve pain (note derivation of word "agony"). Illustrations may be drawn from experience:
   1. Wrestling, boxing, racing, football, etc.

D. Play courts the difficult and heroic. Illustrations may be drawn from—
   1. Hardy games, sports, dares, "stunts," etc.
   2. Play ideals of boys and youth.
   3. Literature. (See McKenzie, pp. 19, 24, 25, 27; Johnson, George E.: "The fighting instinct, its place in life.")

E. Play contributes directly to human progress. Illustrations may be drawn from—
   1. History.
      (*a*) Darwin's play led to scientific research.
      (*b*) Wright brothers' kite play led to first successful airplane, etc.

F. Play can be taught without destroying the spontaneity of play. (See Gulick, The Doctrine of "Hands Off" in Play; Lee, pp. 215–217; Curtis, pp. 179–246; also Johnson, "Why teach a child to play.")
   1. Play has always been taught (illustrate).
   2. Supervised play increases "freedom" (illustrate).
   3. Coach is welcomed by boys.

II. DIFFERING VIEWS OF PLAY.

A. Play is incidental.
   1. This view regards play as a mere incident in childhood of no special moment.
   2. This idea is rapidly disappearing.

B. Play is recreational.
   1. This view regards the value of play as consisting in physical restoration of depleted powers.
   2. This idea is very common.

C. Play is an essential element of growth and development, physical, mental, and moral.
   1. This is the only adequate view of play and is rapidly extending.

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OUTLINE 2. NATURE OF PLAY.

The educational value of play was understood by many philosophers and writers of earlier times. They said many significant things about play, but no attempt was made to give a scientific explanation of play until modern times. Various theories have been advanced, notably those of Spencer, Schiller, Groos, and Hall. While these explanations of play differ in important respects, each has contributed to a better understanding of this special phase of life. All agree in explaining play from a biologic as well as a physiologic and psychologic point of view. Incidentally, the sharp contrast between play and work has been broken down and play has been accepted as one of the efficient means of achievement in education and in later life.

I. EARLIER VIEWS OF PLAY.

A. Plato advocated education by plays and games, emphasized freedom, and regarded play as preparation for future occupations. (See Plato, The Laws I, p. 643, VII, p. 797; Compayré, p. 33.)

B. Quintillian advocated education by means of play and emphasized the value of approbation and consciousness of growth. (See Compayré, p. 49.)

C. Fénelon advised instruction through play and discountenanced an unwise distinction between play and work. (See Compayré, p. 177.)

D. Comenius said that play was the most important thing in the child's life and that the greatest service which parents could render their children was to encourage play. Play must be supervised, and joyousness is the lifespring of the child. (See Monroe, p. 117.)

E. Rousseau said that the native tendencies of children were all good. Education should be through play. The child's play is purposeful. Play and work are identical to the child. The heart is the measure of learning. (See Payne, pp. 144, 127, 128.)

F. Schiller said that play applies to the moral and spiritual nature as to the mental and physical. Play is growth. In play is the genesis of art.

G. Froebel said that play is growth. Play proceeds from the nature of the child. Play is spiritual as well as physical. Play is an epitome of human activity. (See Froebel, pp. 40–127.)

II. LATER THEORIES OF PLAY.

A. State offhand your own explanation of the phenomenon of play.

1. Why do children play at all?
2. What is the explanation of the forms their play activities take?
3. Why do adults play at all?
4. What is the explanation of the forms their play activities take?
5. Why do adults pursue some of the play activities that children follow, but not others?

B. Surplus energy: Richter, Schiller, and Spencer.

Play is due to overflow of energy. (See Groos, pp. 1–24.) (How might this theory be modified?)

C. Recreation: Lazarus.

Play is due to the need of recreation. (What helpful elements, if any, are there in this theory? What objections might be made to it?) (See Groos, pp. 1–24.)

D. Instinct: Groos.

The origin of play is instinct. Play is not due to youth; youth follows from the need to play. Play is a preparation for future serious occupations. (See Groos, pp. 25–81.) (Are there limitations to or weaknesses in Groos' theory?)

E. Racial memory: Hall.

Play is due to the motor habits of the past of the race persisting in the present. Play is backward looking, not forward looking, as Groos regards it. (See Hall, pp. 202–236.)

F. Relaxation: Patrick.

The play of children is one thing; the play of adults is another. Play of children is due to the fact that they can not work; play of adults is due to the need of relaxation. (In what respects, if any, does Patrick agree with views previously mentioned?) (See Patrick, pp. 29–95.)

G. Growth: Lee.

Play is growth. (How does Lee differ, if at all, from Groos? Is Lee's view consistent with Hall's and Patrick's?) (See Lee, pp. 5–7; 57–61.)

H. Structure-function.

The explanation of play phenomena, as in the case of animal behavior in general, must be sought in organic structure. Play activity varies as the structure of the animal varies; "and the minuteness of adaptation thus shown in the way of structure knows no bounds." (See James, vol. 2, p. 384.)

1. Each individual human begins in the lowest form of animal life and progresses through essential forms to birth, then to maturity.
2. Every stage of individual human development is accompanied by change in organic structure and change in characteristic predispositions.
   (*a*) Instinct, as the word is commonly used, may be defined as the inherited predisposition of an organism toward a particular type of unlearned response to a state or situation.
      (1) Acquired predispositions are inherited predispositions modified by experience.
      (2) Inborn predispositions are not supplanted, but are adapted in the process of forming acquired predispositions.
3. Play may be regarded as the activity in which the predispositions, inherited and acquired, find appropriate expression.
4. The play of man, then, is an activity for which the individual is first biologically adapted, then physiologically fit, and finally psychologically inclined.
5. It is not due to surplus energy, except so far as is indicated above; it is not an instinct, but all so-called instincts are expressed in it; it is not due to inherited or racial memory, of the existence of which we have no adequate proof; it is not growth, but includes growth; it is not due to need of recreation nor to need of relaxation, but these are frequently accompaniments of it.
6. In the case of adults, it is sometimes atavistic, but normally it is structure-functional; it may be recreational or educational, or both.

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III. PLAY AND WORK.

The frequently ill-advised contrast between play and work is due partly to the fact that "play" in the popular meaning is mainly used objectively as referring to the activity, while the psychologist or educator is more apt to use the word subjectively as referring to the mental attitude in the activity. There is no objective criterion that may be applied to distinguish play from work; the only criterion is a subjective one.

This subjective criterion, however, is not simply a superficial psychologic attitude: it is the result of biologic and physiologic as well as of psychologic factors.

Play may be regarded as an activity in which the predispositions find appropriate expression. Work may be regarded as an activity in which the predispositions do not find full and appropriate expression. Play and work differ in the degree in which they are activities for which the individual is biologically adapted, physiologically fit, and psychologically inclined. The play of children, since it conforms to the changing structure of developing organs, has great developmental and conservational value beyond that of work. Educationally, also, play rather than work is the line of least

resistance, least fatigue, greatest plasticity, greatest intensity, and greatest interest. Vocationally, work is less fatiguing, more intense, more interesting, and more efficient, as it conforms to the characteristic of play. More specifically, any act tends to fall under play or work as it is conditioned favorably or unfavorably by the following factors:

A. Biologic.
   1. Structural predisposition. (See Carr, cited above, pp. 1–47; also Dearborn, p. 38.)
      (*a*) State of nascency.
      (*b*) High plasticity of nerve cells.
      (*c*) High irritability of nerve cells.

B. Physiologic.
   1. Surplus energy.
   2. Expansive and extensive movements.
   3. Favorable neuro-muscular conditions.
      (*a*) Skill.
      (*b*) Rhythm.
   4. Increased nutrition.
   5. Increased circulation.
   6. Increased gland secretion.
   7. Salutary skin action.

C. Psychologic.
   1. Lessened conscious inhibition.
   2. Stimulation of "predispositions," such as—
      (*a*) Hunting.
         (1) Fighting.
         (2) Competition.
      (*b*) Thinking.
      (*c*) Creating.
      (*d*) Herding.
      (*e*) Nurture.
      (*f*) Rhythmic action.
      (*g*) Ownership.
      (*h*) Approbation.
      (*i*) Courtship.
      (*j*) Worship.

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OUTLINE 3. USES OF PLAY.

The uses of play have to do with the conservation, development, and education of the native powers and capacities of the individual. In certain respects play is the most efficient means of developing and perpetuating in the individual the fundamental physical, mental, moral, and social capacities of the race. Incidentally, also, directed play provides a safer, saner, and more social expression of many native tendencies that might otherwise be expressed in harmful ways.

I. FUNDAMENTAL USES OF PLAY.

A. For conservation.

Play is the means whereby the essential powers and capacities of the race are conserved in the individual. Play to a large degree determines:

1. Whether any desirable predisposition of man is weakened or strengthened in the individual (whether, for example, an individual becomes weakly or strongly loyal).
2. Whether a better or worse response becomes habituated to a given state or situation (whether, for example, fear or pugnacity is aroused by brutal injustice); or
3. Whether a worthy or unworthy object becomes habitually associated with a given tendency (whether, for example, athletics or fighting provides an outlet for pugnacity).

B. For development.

Play is the natural means for stimulating the best growth and development of the organs and powers. (See Terman; Tyler; also Johnson, George E.: "The playground as a factor in school hygiene.")

B. For development—Continued.

(*a*) Factors in development. Note the relation of play to the several factors—

(1) Heredity.
(2) Food.
(3) Air.
(4) Sunshine.
(5) Exercise.

C. For education.

(*a*) Physical.

Of the first five great systems of physical education, namely, the Greek, Mediaeval, British, German, and Swedish, the first four were based largely on play; the Swedish, in recent years, has increasingly made use of plays and games. (The relative physiologic effects of play and gymnastics should be compared; also the relative psychologic effects of play and gymnastics.) (See Hartwell; Johnson, "Play in physical education"; also Lee.)

(*b*) Mental.

The relation of motor activity and motor development to mental activity and mental development should be discussed. (See Mosso; Waddle; also Hancock.)

(*c*) Moral.

Is man's moral nature, as is his physical, the result of evolution? Has the moral nature relationship to structure and predispositions? Does the moral nature change at all with changing phases of physical growth and development?

If so, efficient moral training consists in habituating the native and acquired predispositions to respond. (See Topic I, A.) (See Coe; Herbert; McDougall; O'Shea; Paton; Sisson; also Waddle, pp. 255–278.)

(*d*) Social.

The socializing influence of play should be discussed. (See Coe; Herbert; McDougall; O'Shea; Paton; Waddle, pp. 255–278; also Gulick.)

II. INCIDENTAL USES OF PLAY.

1. Recreational.
2. Substitutional.
3. Prophylactic.
4. Cathartic.
5. Corrective.
6. Vicarious.

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OUTLINE 4. PRACTICAL APPLICATION OF PLAY IN CHILD DEVELOPMENT AND CHILD TRAINING.

The practical application of play involves a perspective of the chief types of reaction universal among normal children. These may be classed roughly under "primary play responses" and "secondary play responses." Illustrations of these responses in children may be readily observed by students and easily classified under suggestive headings which are given in the chart and repeated in the text. In this way the student may become familiar with all the chief types of the play of children and youths. The secondary play responses, particularly, will be seen to run parallel with all the great lines of human endeavor and achievement to-day and to tend to establish in the individual certain permanent interests which are identical with those of the present workaday world of adults. Habits corresponding to the type of reaction persisting will be formed, such as those suggested in the chart. Observation and reading along the lines of even a few of the references given and the following out of the suggestions of the text as to practical work will easily clarify the general outline and make it a practical working guide to play leadership, whether in the home, school, or playground.

I. SUGGESTIVE CHART OF THE STRUCTURE-FUNCTION BASIS OF PROCESSES AND BEHAVIOR.

A. Structure.
   1. The physical organism.

B. Functions, including—
   1. Vital processes (depending upon food, air, sunshine, exercise).
   2. Growth.
   3. Reactions to stimuli (the so-called instincts, of self-preservation, self-expression, and race perpetuation) resulting in—

C. Primary play responses.
   1. Play of the body and members.
   2. Play of the senses.
   3. Play of the emotions.
   4. Play of the higher mental powers.

The primary play responses develop tendencies toward—

D. Secondary play responses.
   1. Hunting.
   2. Thinking.
   3. Creating.
   4. Herding.
   5. Nurturing.
   6. Rhythmic action.
   7. Ownership.
   8. Courtship.
   9. Approbation.
   10. Worship.

The secondary play responses result in—

E. Permanent interests.
   1. Physical interests.
   2. Intellectual interests.
   3. Constructive interests.
   4. Moral and social interests.
   5. Story interests.
   6. Dramatic interests.
   7. Art interests.
   8. Property interests.
   9. Nature interests.
   10. Music interests.
   11. Family interests.
   12. Political interests.
   13. Religious interests.

Pursuit of permanent interests forms—

F. Habits and traits, corresponding to type of reaction persisting, such as, for example—

1. Pugnacity, courage, heroism, or lack of such.
2. Resentment, sense of fairness, justice, or lack of such.
3. Cooperation, loyalty, patriotism, sacrifice, altruism, or lack of such.
4. Self-preservation, self-respect, self-control, temperance, honor, dignity, or lack of such.
5. Obedience to command, rule, law, ideal, conscience, or lack of such.
6. Alertness, interest, studiousness, or lack of such.
7. Admiration, respect, reverence, worship, or lack of such.
8. Affection, love, gentleness, devotion, or lack of such.

And many others.

II. DISCUSSION OF CHART.

A. Structure.

Structure is the inherited organism, determining the natural behavior of the individual.

B. Functions. Functions of the individual include:

1. Vital processes (depending on food, air, sunshine, exercise).
2. Growth. (See Section II, Outline 1.)
3. Reactions to stimuli, resulting in primary and secondary play responses as discussed below. (See Section IV, Outline 2, Topic 1, A, 4; Outline 3, Topic II, F; Outline 4, Topic III, B; Outline 6, Topic I, D.)

C. Primary play responses.

All normal children exhibit various responses to stimuli as indicated in the suggestive diagrammatic outline:

1. Play of body and members.

The tendency of motor structure to function in movement as illustrated in the impulsive, reflex, and instinctive movements of infants should be noted. These comprise the elements of all later willed movements. Impulsive, reflex, and instinctive movements should be distinguished. (See Tanner, pp. 275–289.)

(*a*) Random movements.

(1) Impulsive.
(2) Reflex.
(3) Instinctive.

(*b*) Control of body and members.

(1) Equilibrium.

The first plays serve in getting control of equilibrium; sitting up.

C. Primary play responses—Continued.
1. Play of body and members—Continued.
(*b*) Control of body and members—Continued.
(1) Equilibrium—Continued.

pulling self up, or holding in standing position, and in standing alone. Control of equilibrium continues in more and more difficult ways in later plays as will be seen.

(2) Locomotion.

(*a*) Creeping. (See Tanner; also Dearborn.)

"It is a great treat to watch a creeping child." The child shows great excitement in learning to creep. How does a child creep? Seven different ways of creeping are mentioned. Why does child creep? Does child creep without a definite purpose? Needs and opportunities for creeping should be discussed. Tenement house babies are at a disadvantage. (See Tanner, p. 264; also Dearborn, p. 97.)

(*b*) Walking and running.

Children learning to walk should be observed. Is walking a play? Does the child sometimes walk just for the sake of walking, or always from a desire to get somewhere? The difficulties of walking and running are purposely increased by children.

(1) In difficult places—on curbs, slanting boards, rails, fences, logs, etc.

(2) In difficult ways—on toes, heels,

C. Primary play responses—Continued.
1. Play of body and members—Continued.
(*b*) Control of body and members—Continued.
(2) Locomotion—Continued.
(*b*) Walking and running—Con.
sidewise, backward, hopping, etc.
(3) With apparatus—stilts, skates, etc.
(4) Rhythmic walking—skipping, marching, dancing.

Physical significance of walking plays should be noted; they involve fundamental muscle groups of the greatest value physiologically. Walking and running plays are specially valuable on account of tendency to separate brain and brawn in present-day work. Lists of illustrations of the types mentioned above should be described and discussed. Ways in which walking plays may affect mental development should be mentioned. Moral implication should be noticed in the walking plays. Some practical applications should be suggested of walking plays, as

C. Primary play responses—Continued.
1. Play of body and members—Continued.
(*b*) Control of body and members—Continued.
(2) Locomotion—Continued.
(*b*) Walking and running—Contd. in games, hiking, use of playground apparatus, skating, marching, dancing, walking clubs, etc.
(*c*) Jumping.
In what ways do little children jump?
(*d*) Climbing.
Observe the climbing plays of little children.
(*e*) Swinging.
What constitutes the fascination of swinging for children? What is the value of swinging? Are there any objections to swinging? (See Lee, pp. 148–151.)
(*f*) Swimming.
In tropical countries, children learn to swim almost as soon as they learn to run. What is the secret of the passionate fondness of children for swimming? What is the educational value? Relation of age to learning to swim. (See Johnson, George E.: Education through Recreation, pp. 20–24.)
(*g*) Riding.
Ways and value of riding should be discussed. Moral as well as physical effects should be described and discussed.
(3) Control of speech organs.
What is the structural basis of speech? The first attempts at lan-

C. Primary play responses—Continued.

1. Play of body and members—Continued.

(*b*) Control of body and members—Continued.

(3) Control of speech organs—Continued.

guage of infants should be observed, as in the cry, various tones, gestures, babbling, rhythmical repetition of syllables, imitation of sounds, and the like. Examples of invented language should be noted. (See Waddle, pp. 151–184.)

(4) Control of matter by body and members.

The spontaneous acts of children should be observed, such as—

(*a*) Clinging.
(*b*) Grasping.
(*c*) Lifting.
(*d*) Placing, piling up things—blocks, etc.
(*e*) Pushing.
(*f*) Pulling.
(*g*) Kicking.
(*h*) Throwing.
(*i*) Striking and pounding.
(*j*) Shaping sand and dirt.

(5) Gymnastic stunts. (See Johnson, George E.: "Education by plays and games.")

The gymnastic feats of children of different ages should be observed. Lists of illustrations of types of play (see Topics (3), (4), (5)) should be made.

2. Play of the senses. (See Tanner; also Groos, pp. 7–73.)

Experimentation of children with the various senses at different ages should be observed.

(*a*) Touch.
(*b*) Sight.
(*c*) Hearing.
(*d*) Taste.
(*e*) Smell.

3. Play of the emotions. (See Groos, pp. 158–168.)

The way in which emotions of children are aroused in their plays and games should be observed; also the

C. Primary play responses—Continued.

3. Play of the emotions—Continued.

way in which certain emotions are voluntarily excited by children.

4. Play of the higher mental powers. (See Groos, pp. 121–157.)

The plays of children at different ages, stimulating remembering, imaging, reasoning, and willing should be observed. Lists should be made. (See Johnson, George E.: "Education by plays and games," pp. 186–193.)

D. Secondary play responses.

The primary play responses invariably develop tendencies toward what, by many writers, are regarded as special instincts, but which we may refer to as secondary play responses. These secondary play responses are by no means clearly differentiated one from another; very seldom, if ever, do they act alone. These and the primary play responses have many roots in common, as indicated in the chart. (See Topic I.)

1. Hunting, fighting, and competition.

(*a*) Hunting.

The activities of children which are allied to hunting should be observed, beginning with infants and continuing with respect to older children. (See James, vol. 2, pp. 411–415; Lee, pp. 13–18, 465–467, 494; Thorndike, vol. 1, pp. 52–104, 120, 267.)

Hunting takes many forms: Hunting animals, fishing, general search in fields and woods: berrying; nutting; collections; stones, eggs, flowers, insects, etc. Note relation to science, also relation of mental search to hunting: Conundrums, puzzles, mathematical problems. Undirected hunting play easily degenerates to antisocial forms, such as fruit stealing, predatory raids, etc.

(*b*) Fighting.

The manifestations of anger in infants and older children and the methods of resistance and attack should be observed. Anger should be dealt with with the greatest possible care, as it is the basis of great moral force. (See Ross, pp. 36–40; also Hall, vol 1, pp. 220–223; vol. 2, pp. 367–370.)

D. Secondary play responses—Continued.

1. Hunting, fighting, and competition—Continued.

(*b*) Fighting—Continued.

Minor forms of fighting, bickering, "scrapping," quarreling, teasing, and bullying should be noted. What underlies the impulse of bullying? How may undesirable forms of fighting be best dealt with? A list of plays and games adapted to provide desirable outlet for pugnacity should be made. (See Johnson, George E.: "The fighting instinct—its place in life.")

(*c*) Competition. (See Cyclopedia of Education, pp. 5–7.)

(1) The effect of competition when it is introduced into any activity should be noted. A brief list of plays and games should be made as follows:

(*a*) Noncompetitive.

(*b*) Competitive and individualistic.

(*c*) Cooperative competitive.

(2) Some uses of competition.

(*a*) Quickens the faculties

(*b*) Stimulates courage and allied virtues.

(*c*) Can be applied as a stimulus in education.

2 Thinking.

(*a*) Sense impressions, remembering, associating, and reasoning are inevitable in the normal brain. Curiosity is the effective state of the mind in the learning process. Curiosity is manifested very early in the infant.

(*b*) The earlier forms of the expression of curiosity have to do with experimentation of—

(1) Bodily movements.

(2) Senses.

(3) Control of matter.

(4) Exploitation of environment, as in hunting.

(5) Experimentation of social environment and persons, as in teasing, fighting, competition, mischief, etc.

D. Secondary play responses—Continued.

2. Thinking—Continued.

(*c*) Roughly, curiosity and interest are manifested somewhat as follows:

(1) In the senses and the great variety of sensuous impressions involved; particularly also in movements and control of body and members.

(2) In continued exploitation of sense and movement; particularly also in imagination and recreation of the world of sense.

(3) In an enlarged conception of the use of fundamental powers and the relating of such to those of their mates in trials of skill.

(4) In venturesome, hardy activity and the habitation of all the powers in rigorous, self-assertive activity; in trials and contests of mental ability, remembering, reasoning, working out puzzles, conundrums, repartee, argu ing, etc. (See Johnson, George E.: Education by Plays and Games.)

(5) In reconstruction of field of knowledge and reorganization of powers to meet the standards of maturer years.

3. Creating.

The primary play responses mentioned under "Control of matter by body and members" develop naturally and readily into such constructive play as in molding in sand and clay, building with blocks, whittling, bead stringing, sewing, crude use of tools, drawing, etc. (A list of illustrations of creative plays of children of different ages should be made. These may be referred to later in the consideration of the constructive interests.) (See Lee, pp. 84–101.)

4. Herding.

(*a*) Infants very early manifest pleasure in the approach of the mother. Peace and contentment may take the place of fretting when the mother is near as early as the fifth month. The first smile is a social expression. (See Lee, p. 74.)

D. Secondary play responses—Continued.

4. Herding—Continued.

(*b*) The desire for companionship has a biologic foundation. The baby's interest is doubtless related to physical wants. From the second year a gradual association of persons with care, food, protection, etc., is established.

(*c*) The next conscious appreciation of companionship seems to be associated with play. The child is interested in companions on the basis of what he can do with them. The general characteristic changes of attitude in play companionship may be briefly summarized.

(1) From early infancy to 3 years, the child plays with an adult or older person, or plays at the same things with one or two other children.

(2) From 4 to 6 years he plays with one or several playmates of corresponding age, often combining efforts for a common end. Few, if any, games are attempted without the leadership of elders.

(3) From 7 to 9 years he plays in groups at the same things or for common ends. Games are attempted, the child often attaching himself to other children.

(4) From 10 to 12 years continued interest in individual playmates is shown, but he begins to attach importance to rather permanent groups; interest in adult leadership is relatively small. At this time gang interest takes firm hold. At this age goodness, wealth, social position are of little interest in choice of companions.

(5) From 13 to 15 years new elements come into choice of companions, such as wealth, dress, personal worth, scholarship, etc.

(*d*) Creating and herding lead to many important plays, such as imaginative creations, imitating, acting a part, dramatic plays, story tell-

D. Secondary play responses—Continued.

4. Herding—Continued.

(*d*) Creating and herding, etc.—Continued.

ing, competing, cooperating, and others. (See O'Shea; Puffer; Lee, pp. 62–433; also Johnson, George E.: Education by Plays and Games.)

5. Nurturing.

The nurturing activities of children are mainly included under—

(*a*) Care of plants.

(*b*) Care of animals.

(*c*) Doll play.

The nurturing activities of children should be observed and suggestions should be made as to their use in child training. (See Hall, Dolls; Lee, pp. 74–84; 218–227; also Hall, Adolescence, vol. 2, pp. 220–229.)

6. Rhythmic action.

Rhythm is frequently present in the movements of infants, also in the babbling and early speech. Intoning, drumming, skipping and dancing provide the elements of the later music interests. Rhythm of movements is also an important element in some forms of skill, endurance, and enjoyment of work. Activities of children which involve rhythmic action should be observed and recorded. (See Lee, pp. 143–165; Tanner, pp. 234–246.)

7. Ownership.

(*a*) Every child longs to possess something as his very own, and nothing brings more quickly a sense of pride and of worth or of extension of personality than ownership creditably acquired. What one possesses becomes, in a way, a part of himself, and the common law protects a man in what he rightly owns, as it protects his person.

(*b*) Ownership developed with the activity of hunting. In its primitive form it is still operative among boys who roam the field and woods. "Finding is keeping." Transfer of claim on an object found to claim on brook or tree or spot where the treasure was found gradually took place. This transfer sometimes occurs in boyhood customs to-day.

D. Secondary play responses—Continued.

7. Ownership—Continued.

(*c*) Ownership following making also as naturally as it followed finding. To create is to acquire a sense of ownership keener perhaps than that of any other method of gaining possession. Ownership stimulates particularly the tendencies to nurture and to create. (See Topics D, 3 and 5.) (See Johnson J.; Thorndike; Tanner, p. 292; also Waddle, p. 216.)

8. Courtship.

It is of importance to appreciate the various influences of sex in children. It is of great importance to find proper ways of bringing the sexes together in play of childhood and youth. Likes and dislikes and differentiations in plays and games of children and youth due to sex should be observed and recorded. (See Tanner, pp. 107–120.)

9. Approbation.

(*a*) A desire for approval, praise, and admiration, natural to the human heart, is exemplified in many ways in childhood. Every boy is expected to demonstrate his worth in some way to his gang, and he covets the approbation accorded him for successful performance. Public opinion owes its power to the sensitiveness of man to approval or disapproval, and conscience owes its pangs to the fact that one may not hide from self-condemnation for his evil deed, however safely hidden it may be from public knowledge. A wise man remarked that he could convert an unruly gang of lads with a yard of ribbon, and the coveted croix de guerre only symbolizes what is perhaps the acme of public approval to the hero who wears it.

(*b*) Play affords many opportunities for the appeal of approbation. (Ways in which this is illustrated in the plays and games of children and youth should be observed and recorded. Note should also be made of the way this is related to moral codes and social standards. Illustrations should be drawn from personal experience and literature.)

D. Secondary play responses—Continued.

10. Worship.

(*a*) There is a strong tendency in children and youth to worship something. This worship may or may not have a religious significance, but the attitude of mind toward the object worshiped is in a sense much the same in any case. The ancient Greeks worshiped deified warriors, and the boys make worshipful heroes of the strong and mighty of the football field and the diamond. (Instances of hero worship in children and youth should be observed and recorded, and note made of the possible ways of utilizing this attitude in education.) (See Lee, pp. 186–192, 316, 324–327.)

(*c*) Boys also admire and hang about a man who can make things. The idea of worship has always been related closely to creation. So the child or youth who is engaged in creative work, who realizes his relationship to universal laws and processes, tends naturally to an attitude of mind, in a way, like that of worship.

(*d*) This attitude is a powerful incentive to him who experiences it and increases the satisfaction in nurture and creative work of every kind. Nature alone could not have produced the improved domesticated animals, plants, and the mechanical developments that have had so much to do with the advancement from primitive to modern conditions in life. Herein man has become one with the forces of the universe, alike receiving from and extending the process of creation. Through nurturing and creating a child may be made to feel his relationship to universal laws and processes. (See Wolf: also Marot.)

E. Resulting permanent interests.

The primary and secondary play responses tend to establish more or less permanent interests readily recognized. However, these interests can seldom, if ever, be wholly differentiated from each other, and no attempt has been made toward an exclusive classification. The several interests have common roots and overlap. Few activities can be said to be due to any

E. Resulting permanent interests—Continued.

single interest. Roughly, the interests that have been named include every field of human endeavor and achievement.

1. Physical interests.

Here may be included especially those interests which call for vigorous physical activity. (See Johnson, George E.: Education by Plays and Games, pp. 84, 85, 87, 90, 91, 95, 96, 97, 156, 157, 158, 207, 208.)

(*a*) Free play.

Activities of this kind include a variety of plays which children and youth find out largely for themselves in favorable environment. They begin with the activities listed under "Primary play responses," but evolve gradually into higher and more complicated forms in succeeding years. These plays provide, especially, sensory, motor, and emotional experiences fundamentally important in education and leading to possible permanent avocational interests.

(1) An outline should be made of the provisions that should be made to stimulate beneficially the different types of the free play of children, following the list given under "Primary play responses," especially that part included under Topic II, C, 1, b.

(2) It should be shown how these plays are related to the various predispositions mentioned under "Secondary play responses." Their relation to "Permanent interests" and to traits of character and habits formed should also be noted. An outline should be made of a course of plays suited to children of different ages.

(*b*) Games.

(1) Games peculiarly involve competition and cooperation. They serve especially the following purposes:

(*a*) To aid essential biologic and physiologic growth.

(*b*) To make the body the perfect organ of feeling, thinking,

E. Resulting permanent interests—Continued.
1. Physical interests—Continued.
(*b*) Games—Continued.

and execution, even under stress of great excitement.

(*c*) To develop the elemental individualistic virtues.

(*d*) To provide for the expression of the individual in social relations and for social ends.

A list of games adapted for these various purposes arranged with relation to various age groups should be made. (See Johnson, George E.: Games That Every Boy and Girl Should Know; Bancroft; Stecher; Sperling; Parsons; Moses; Crampton; Curtis; Gomme; also Johnson, George E.: Education by Plays and Games.) In the selection of games choice should be made with some regard for certain elements that are essential at some period of childhood or youth, as follows:

(*a*) Agonistic, involving personal encounter of strenuous nature, such as boxing, wrestling, and football.

(*b*) Athletic, including competitive games with only a slight element of personal encounter, such as baseball, track and field events, rowing, hiking, skating, swimming, etc.

(*c*) Gymnastic, involving feats of bodily control, strength and agility, such as climbing, tumbling, vaulting, wall scaling, bar and ladder work.

E. Resulting permanent interests—Continued.

1. Physical interests—Continued.

(*b*) Games—Continued.

(*d*) Rhythmic, including marching and dancing. See Gulick; also Johnson, George E.: What to Do at Recess. (An outline should be made of a course of games suited to children of different ages.)

(*c*) Athletics.

(1) Athletic standards.

Careful records of the athletic achievements of children from 8 years of age upward have now given us standards of athletic measurement of considerable reliability and significance. These may be used not only for the knowledge they will give of the relative physical efficiency of the children, but also for the stimulus they afford. They may be used as a basis of competition between near or distant groups. (See Brown; Athletic Badge Test for Boys; Athletic Badge Test for Girls; Stecher, pp. 194–195; Official Handbooks: Bancroft and Pulvermacher; also Reilly.) (A comparison should be made of athletic standards with competitive games, as to educational importance. See Johnson, George E.: Education Through Recreation, pp. 29–32.)

(2) Intraschool games.

The types of activities thus far mentioned are not alone sufficient. They need to be supplemented by group contests which involve more keenly the elements of competition, cooperation, and loyalty. These elements are never involved so com-

E. Resulting permanent interests—Continued.
1. Physical interests—Continued.
(c) Athletics—Continued.
(2) Intraschool games—Continued.

pletely as when the players represent some larger group. Intraschool competition as between classes gives a greater importance, dignity, and permanency to the teams than is possible under the "scrub" team idea. These intraschool games may be made to include a very wide variety of sports, both summer and winter, and classes may be so subdivided and groups so arranged as to include every able-bodied boy and girl in one activity or another.

It is possible also through judicious mingling of different ages and abilities, or even of sexes, in the groups, to extend participation in team games almost without limit where otherwise teams would be unequally matched.

(3) Interschool games.
(a) Nature and significance of the athletic interests.
(b) The problem of health.
(c) The interrelation of elementary school, secondary school, and college athletics.
(d) The ethics of athletics.

Interschool games do not exist primarily for physical education, but rather as the keystone of the interest in school athletics and as a basis for the expression of loyalty. Youth will never be satisfied with intraschool games alone. And it is well that they should not The physical, mental, moral, and social incentives in athletics are tremendously intensified in interschool athletics. The intense desire to win manifested in interschool games is entirely whole-

E. Resulting permanent interests—Continued.
1. Physical interests—Continued.
(*c*) Athletics—Continued.
(3) Interschool games—Continued.
(4) The ethics of athletics—Contd.

some. Of course, it makes all the difference in the world how a game is won, and unworthy winning, or rather falsely appearing to win, is as bad in athletics as dishonorable acts are anywhere. It is not a condemnation of business that some men are dishonest in it, and it is no condemnation of interschool athletics that some try to win unworthily.

It is not possible to have too keen a desire to win, if that desire is always subordinated to ideals of good sportsmanship. In fact, the great moral opportunity of interschool athletics lies in the intense desire to win and the subordination of that desire to high standards of sportsmanship that will not stoop to conquer. It is on the field of interschool athletics that we have the best opportunity for the training of young men under great emotional stress with relation to ideals and standards of conduct; it is here, better than elsewhere in school work, that education may contribute both to emotional strength and control. And this applies to followers even more, for the ethics of athletics, as has been said, are the ethics of the student body even more than of the participants in the contest. (See Johnson, George E., "A defense of intercollegiate athletics;" Bowen, "Athletics and morals;" Stearns; Stewart; Foster; Ball; Johnson, Franklin W.; Athletic Research Society, Proceedings; American Physical Education Review, Files; also Mind and Body, Files.)

E. Resulting permanent interests—Continued.

1. Physical interests—Continued.

(*d*) Miscellaneous activities.

(1) Noncompetitive outdoor interests.

(2) Club activities.

The main problem here is to organize groups under the patronage of the playground or school so as to provide opportunity for more systematic and successful expression of many interests of pupils now but slightly influenced by teachers. Among these are the nature interests: Hiking, bicycling, camping, hunting, etc. Herein lies an opportunity for the teacher who is not skillful or interested in conventional athletics to identify himself with extra-school activities of pupils. The school may also greatly extend its influence in extra-school activities through participating in the already well-organized movements of the Boy Scouts, Camp Fire Girls, Girl Scouts, or others. (See Johnson, George E.: Education Through Recreation.)

2. Intellectual interests.

(*a*) The intellectual interests permeate all fields of human interest, but there is a tendency toward intellectual activity for its own sake analogous to that in the field of the physical interest. All early plays of children, as outlined under "Primary play responses," but specially plays of experimentation with the senses, curiosity, the general process of learning, guessing plays, conundrums, puzzles, mental contests, and mental achievements, exemplify play in this field.

(*b*) Zest of intellectual hunting and display of intellectual prowess in the activities in the various fields of human interests are to be specially considered, but use should be made of miscellaneous intellectual plays and games of chil-

E. Resulting permanent interests—Continued.

2. Intellectual interests—Continued.

(*b*) Zest of intellectual hunting, etc.—Continued.

dren which make trial of mental alertness, imagining, remembering, and reasoning. (A list should be made of such plays and games from observation of children's play and from consultation of books of plays and games.) (See Johnson, George E.: "Education by plays and games.")

3. Constructive interests.

(*a*) Rooted in the primary play responses generally, but especially in control of matter by body and members and in play of the higher mental powers, constructive activities, both physical and mental, become a chief field of human activity and endeavor.

(Lists of constructive activities should be made, suitable for children of different ages, from observation of such activities and from consultation of books of plays and games.) (See Johnson, George E.: Education by Plays and Games, pp. 90, 98, 158, 222; also Marten; Beard; Miller; also Young Folks' Directory.)

4. Moral and social interests.

(*a*) Morals and codes and social standards are inevitably and strongly affected by play activities. Nothing is of more importance to the student of play than to appreciate the relation of play to character.

(*b*) Primitive man was predisposed to acts that were biologically and socially beneficial. Intelligence came to recognize such acts as beneficial. Codes and standards developed from such recognition. The individual (varying more or less from the mean) was judged good or bad as he conformed to or departed from codes or standards. These codes and standards helped to confirm the individual in biologically and socially beneficial acts. The diagrammatic outline suggests the relation of play to character. Traits and habits are determined by the type of reaction of the individual persisting through the "primary play

E. Resulting permanent interests—Continued.

4. Moral and social interests—Continued.

(*b*) Primitive man, etc—Continued.

responses," "secondary play responses," and "permanent interests." (See Chart.) (A suggestive outline should be made of play activities of different ages with reference to the moral implications and the development of desirable traits and habits.)

5. Story interests.

(A suggestive list of stories should be made suitable for children of different ages.) See Stories and Poems for the Kindergarten: Cowles: Bryant; Olcott; Wyche; Baker; Partridge; also Lyman.

6. Dramatic interests.

(*a*) Among the most familiar of the plays of little children are the dramatic and imitative plays, by which children in make-believe enter into almost every occupation and profession of men. The dramatic interest is practically universal and persists in adult life, and some of our more important social and civic problems are related to the drama. This dramatic instinct of children has in late years been very widely used in schools as an aid in teaching reading through story acting, lending great charm to the reading lessons of young children, and also in teaching history and literature. In social work the value of dramatic play for children and adolescents has been widely recognized and utilized. But all this has been little compared to what the school might accomplish. Local and civic problems, as well as educational problems, are bringing home to the attention of the schools this question of the dramatic interests in education. (See Johnson, George E.: Education Through Recreation, pp. 75–78; Lee, pp. 107–165; Curtis; Edwards; Wallin; Young Folks' Directory; Davol; Chubb; MacKay; Langdon; Lincoln; also Beegle and Crawford.)

7. Art interests. (See Lukens; Barnes; Hall, Educational Problems, vol. 2; also Tanner, pp. 393–415; MacKenzie; Clement; Wilson; Waddle, pp. 185–208; also Sargent.)

E. Resulting permanent interests—Continued.

7. Art interests—Continued.

(*a*) Students have sought the genesis of art in play. Play offers peculiar opportunities for the development of the art interests. It is important that the attempts of children at art should conform to the spirit of the play. (An outline should be made of the ways and means of utilizing play in the development of art interests.)

(*b*) Activities of children that involve artistic representation or decoration.

(1) Modeling.
(2) Drawing.
(3) Painting.
(4) Carving.
(5) Embroidering.
(6) Beadwork.
(7) Picture study.
(8) Photography, etc.

8. Property interests.

(*a*) Ownership of childish possessions extends naturally to interest in conventional property. Opportunity in childhood and youth for earning money and acquiring personal property on basis of current values for service rendered (and not simply on basis of gift or allowance) is of great importance. (A list should be made of wholesome ways in which children and youth might earn money in activities allied to play interests.)

9. Nature interests. (See Bureau of Educational Experiments Bulletins; Comstock; Greene; Hodge; Johnson, Constance; Kelly; Kern; also Miller.)

(*a*) Interest in nature is allied to interest in such physical activities as hiking, camping, hunting, fishing, etc. It is important to continue so far as is practicable the ready contact of children with nature. Included in the activities of special importance are the following:

(1) Gardening.
(2) Nature collections.
(3) Pets.

E. Resulting permanent interests—Continued.

9. Nature interests—Continued.

(*b*) An outline study should be made of ways and means for utilizing the nature interests in education.

10. Music interests.

Singing and instrumental music should early become fixed interests of children. Group singing and symphony orchestras, playing of musical instruments, orchestras, and bands provide opportunities for the expression of musical interests of great educational and social importance. In orchestras and bands is to be found opportunity for cooperative action comparable to that found in team games. The orchestra is one of the easiest types of social activity to start and maintain in the school, or social center. Organizing of bands in school buildings has been said by police authority to have been of greater influence in checking undesirable gang activities than any other agency. (See Dorrett; Tanner, pp. 339–372; also People's Music League of the People's Institute.)

11. Family interests.

(*a*) Child nature flourishes best in the environment that only a home at its best can provide, a home with father, mother, brothers, and sisters. If the family has been an essential factor in human progress, the maintenance of its influence will depend on the degree to which it continues to meet those peculiar needs of the child which family environment alone can fully supply.

(*b*) An adequate home alone can perpetuate an adequate family interest. It is essential that, commensurately with the increasing complexity of social life, the home become increasingly intelligent in regard to the child's needs and interests.

(*c*) There is the economic problem also, but the enrichment of the family life, as such, is of prime importance. This can be done only when the predispositions of the members of the family find adequate expression in family relationships. It is this background of happy home experience that develops the genuine family interest and perpetuates it from generation to generation.

E. Resulting permanent interests—Continued.

11. Family interests—Continued.

(*d*) An outline should be made of ways in which play and recreation may help to strengthen the family interests and increase the enjoyment of life in family relations.

12. Political interests.

(*a*) The political interests of children and youth are manifested in their gangs, ball teams, and clubs. It is to be hoped that educators may find ways and means of utilizing the political interests in a progressive way that leads from the earlier expressions naturally and gradually into the interests and duties of citizenship. Much has been accomplished through various organizations of boys and girls, such as Boy Scouts, Girl Scouts, Camp Fire Girls, and others, and through self-government in playgrounds and schools.

(*b*) Ways in which the political and legislative faculties of children and youth may be utilized in the development and rules in games, the conduct of play activities, and the management of play space and play activities should be observed and recorded. (See George; Fiske; also Cronson.)

13. Religious interests.

(*a*) Creation and service, colored by the attitude of worship, are essentially religious. Whatever the source or character of the religious teaching, the springs of human nature, in favorable environment, become a "well of living water." Religious teachers no longer deny but call to their aid the native interests of children and youth, and find therein ready soil for their teachings.

(*b*) The predispositions of children that might justify the saying, "of such are the kingdom of heaven" should be noted.

(*c*) The predispositions of children that might be called "original" virtues should be mentioned.

(*d*) The predispositions of children that might be regarded as tending to the religious attitude should be brought out.

E. Resulting permanent interests—Continued.

13. Religious interests—Continued.

(*e*) An outline of the ways in which play and recreation might aid in moral and religious education should be made. (This should be related to outline under A, 3, c(4), also d.)

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OUTLINE 5. THE PLAY MOVEMENT.

I. The present interest in the practical application of play to educational and social problems has resulted from a number of interrelated causes. These have contributed to the modern play movement, which is really modern only in the changing phases of a movement that is as old as the race. Among these should be mentioned the following:

   A. The acceptance of a general theory of organic evolution.

   B. A new appreciation of the place of play in the education of primitive races and ancient peoples.

   C. The realization of the office of play in the development of literature, art, music, science, and social ideals.

I. The present interest in the practical application of play, etc.—Con.
   D. The kindergarten movement.
   E. The child-study movement.
   F. The development of boys' and girls' organizations.
   G. The playground movement.

II. In one sense, play is the most ancient and venerable of human interests.
   A. Primitive peoples had a rich play life, and ancient nations held play in high esteem.
   B. Before man was consciously directed by education of the young, play was the chief means of education, and often national systems of education were developed; play was still the basis of the curriculum, as was so notably the case at Athens. (See Davidson, Gardiner, McKenzie; also Hartwell.) (An outline should be made of the history of play in education.)

III. In another sense, all fields of knowledge, science, art, and industry developed through play.
   A. In the minutely differentiated processes of modern industry there has been, in a large measure, a departure from the former natural incentives to activity, and in a measure also an unwholesome and unnecessary differentiation of play and work.
   B. Differentiation of play and work has naturally led to a confusion of play and recreation and overemphasized recreation.

IV. Periods of great human advancement have been accompanied by a renaissance of play, while periods of retrogression have often been accompanied by a narrowing of play incentives in life's activities and overemphasis on recreation as a result from work. (See Fisher, p. 376.)

V. Some phases of the new renaissance of play are as follows:
   A. The kindergarten movement.
   B. The acceptance in education of a biologic point of view.
   C. The child study movement. (This should be briefly traced. See Gesell; also Waddle.)
   D. The development of boys' and girls' clubs, Boy Scouts, Girl Scouts, Camp Fire Girls, and others.
   E. The Young Men's Christian Association, the Young Women's Christian Association, and similar organizations in their later phases.
   F. Summer camps for boys and girls.
   G. The playground movements. (A brief outline should be made of the development and purposes of boys' and girls' organizations.)

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OUTLINE 6. ORGANIZATION AND ADMINISTRATION OF PLAY AND RECREATION.

The noncommercial organization and administration of play and recreation present the problem of utilizing existing agencies or creating new ones. Four different bodies, or combinations of these bodies, have been most commonly concerned with the organization and administration of play and recreation. The points of strength and of weakness of the various types of organization and administration appear on close study. The fact that the organization and administration of play is an educational necessity in every system of public education has an important bearing on the estimate of the

strength or weakness of a given type of organization and administration.

I. Play and recreation for general educational and social ends have been mainly organized and administered under the following public bodies:
   A. Board of education.
   B. Park board.
   C. Playground association, or other form of private organization.
   D. Recreation commission.

II. These agencies have developed mainly the following types of centers.
   A. Small detached playgrounds.
   B. Reorganized school playgrounds.
   C. Athletic fields.
   D. Large detached playgrounds, or recreation parks.
   E. Reorganized large parks.
   F. Recreation centers in school buildings.
   G. Vacation schools.
   H. Gardens.
   I. Roof playgrounds.
   J. Swimming pools, beach bath houses, and gymnasia.

III. The several types of organization and administration have characteristic elements of strength and weakness varying more or less with local conditions. Some of the characteristic elements of strength or weakness of the different types are as follows:
   A. Board of education.
      1. Strength.
         (*a*) Prestige.
         (*b*) Taxing power (at times).
         (*c*) Ready support of public.
         (*d*) Accessibility of parents and children.
         (*e*) Control of property.
         (*f*) Permanency of organization.
         (*g*) Commonly educated personnel.
         (*h*) Necessity of organizing and administering the play of pupils for educational purposes.
      2. Weakness.
         (*a*) Conservatism.
         (*b*) Lack of appreciation of play.
         (*c*) Obsolete type of architecture.
         (*d*) Small yard space.

III. The several types of organization, etc.—Continued.

B. Park board.

1. Strength.

(*a*) Control of grounds.

(*b*) Existence is for recreational purposes.

2. Weakness.

(*a*) Lack of social and educational ideals (at times).

(*b*) Lack of experience in general social and educational problems.

(*c*) Centers often remote from the people.

(*d*) Necessity of duplicating or supplementing work of board of education.

C. Playground association.

1. Strength (if already in existence).

(*a*) General disinterestedness.

(*b*) Usually has confidence of the public.

(*c*) Genuine interest in play and recreation.

2. Weakness.

(*a*) Lack of taxing power.

(*b*) Inadequate funds.

(*c*) Not part of city government.

(*d*) Charitable aspect of the work.

(*e*) Necessity of duplicating or supplementing work of the board of education.

D. Recreation commission.

1. Strength.

(*a*) Special body for special purpose.

(*b*) Adapted to certain phases of the problem, as the commercial recreation problem.

2. Weakness.

(*a*) Generally, lack of taxing power; faces prejudice against new taxing bodies.

(*b*) Is a new body.

(*c*) Lack of collective experience in social and educational problems.

(*d*) Necessity of duplicating or supplementing work of board of education.

IV. Consideration of the relative merits of different types of administration involves, first, general consideration of the following questions:

IV. Consideration of the relative merits, etc.—Continued.
   A. Are playground, recreation center, and social center problems mainly problems of public convenience or problems of physical, mental, moral, and social education?
   B. Which body has the advantage as to properties already existing?
   C. Under which body can existing possibilities be utilized or new centers acquired and developed most economically?
   D. Under which body can the centers be most efficiently and economically administered?
   E. Under which body would there be the least likelihood of duplication of work and conflicting authorities?

V. Planks of good administration of play and recreation have been given as follows. (See Hammer.)
   A. Adequate funds.
   B. Competent leaders.
   C. Authority in proper hands in all lines of work.
   D. Complete control of property.
   E. Freedom from political party control.
   F. Proper coordination with other departments of the city.

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[1] In addition to literature and bibliographies cited in outlines.

[2] Recommended as small working library where access to literature is limited.

CHILD LABOR

The outlines in this section are intended to present in simplified form the outstanding features of the child-labor problem. They furnish an approach to the subject, indicate a method of study, and put into easily available form material from many widely scattered sources. They can not, however, be regarded as furnishing information which is either complete or final. The legal and statistical matter contained in the outlines, for example, is subject to continual revision as new laws are enacted and as the results of further research are made known. Especially will the student need to revise the statistics on the extent and distribution of child labor in accordance with the figures of the United States Census for 1920, as soon as the latter are made available.

SECTION VI.—CHILD LABOR.

OUTLINE 1. HISTORY OF THE MOVEMENT FOR THE PROHIBITION AND REGULATION OF CHILD LABOR.

Child labor is not a new problem, resulting solely from the development of the modern factory system. Child labor has always been cheap labor, and wherever its employment has not been regulated, employers have tended to use it excessively. The apprenticeship system of the mediaeval guilds imposed regulations which, where adequately enforced, were in many respects beneficial to the child worker. With the decline of apprenticeship and the growth of the modern factory system, the conditions under which children worked became increasingly hard. Beginning with the early years of the nineteenth century, the public began gradually to recognize the evils of child labor and to provide for its regulation through the passage of legislation. During the past hundred years laws regulating the employment of children in industrial and commercial pursuits have been enacted in practically all civilized countries, and the standards of regulation have been gradually raised from decade to decade.

I. THE MOVEMENT IN ENGLAND.

A. Child labor and its regulation prior to the industrial revolution.

1. Not only were children employed in large numbers from early times in agricultural and domestic pursuits, but also in practically all trades and handicrafts.
2. While in mediaeval times young children were probably employed in large numbers for as long hours, and at as arduous tasks, as under the factory system of the early nineteenth century, their working conditions were in general better because of the regulations of the apprenticeship system under which many of them were employed.
3. The apprenticeship system, established by the craftsmen of the thirteenth century and made compulsory by the mediaeval trade guilds and later by national law, imposed the earliest regulations on child labor. This system when adequately enforced insured to the child indentured as apprentice:
   (*a*) A sound technical training for a skilled trade.

A. Child labor and its regulation, etc.—Continued.
3. The apprenticeship system, etc.—Continued.
(*b*) Further protection against exploitation as cheap labor by restriction of the numbers of apprentices who could be employed and also in some trades by the prohibition of the employment of children under specified ages or without specified educational qualifications.
(*c*) Good working and living conditions during the period of training.

B. The effect of the industrial revolution on child labor.
1. The gradual decline of the guilds and the apprenticeship system (seventeenth and eighteenth centuries) with the development of the factory system (eighteenth and early nineteenth centuries) together brought about a change for the worse in the condition of the child worker, through:
(*a*) The removal of all regulation of conditions of work and of all provision for technical training which had been part of the apprenticeship system.
(*b*) The greatly increased demand for child workers as cheap labor, following the invention of machinery, and their increased use in fatiguing and uneducative repetitive machine processes.

C. Beginning of the public recognition of the evils of child labor and the legal regulation of its abuses.
1. Up to the close of the eighteenth century there had been no public recognition of the evils of child labor. It was, in fact, generally regarded as a matter of course that practically all children should go to work as soon as they were physically able to do so.
2. Through the investigations of abuses of the system of pauper apprenticeship under the poor law, by which paupers were bound out to mill owners, the bad conditions under which not only these but also other children were forced to work were first brought to public attention.
3. During the first half of the nineteenth century a series of parliamentary inquiries which gave striking testimony to the abuses attending the unregulated employment of children in many industries, together with the efforts of such reformers as Lord Shaftsbury, Robert Owen, Sir Robert Peel, and others, gradually aroused public opinion to the need of legal regulation.

C. Beginning of the public recognition of the evils, etc.—Continued.

4. The process of legislative reform was, however, very slow.

(*a*) In 1819 the first act applying to other than pauper apprentices was passed regulating child labor in factories. It applied only to cotton mills, prohibiting the employment of children under 9 years of age and limiting the working hours of children under 16 to 12 hours a day.

(*b*) In 1833 an act was passed prohibiting the employment of children under 9 in all textile mills, limiting the working hours of children under 13 to 9 hours a day and 48 hours a week, and that of young persons between 13 and 18 to 12 hours a day, or 69 a week, and providing for the appointment of factory inspectors. This was the first law to provide for a system of factory inspection.

(*c*) In 1842, as the result of a striking parliamentary inquiry into the conditions of labor in mines, an act was passed prohibiting the employment of boys under 10, and of all girls and women in mine pits, and requiring the appointment of inspectors to enforce the law.

(*d*) By the act of 1844 work on certain dangerous machines was prohibited for children. At the same time the "half-time" system in the textile industries was established, whereby children worked and attended school alternately.

(*e*) In the period 1845–1878 acts were passed raising the age and hour standards and gradually extending their application to all kinds of manufacturing industries.

(*f*) In 1876 the first compulsory school law was passed, requiring the attendance at school of children up to 10 years of age, with certain exemptions.

(*g*) Laws relating to child labor passed during the period between 1878 and the present day have been chiefly concerned with raising the age, hour, and educational standards of child labor in factories and workshops and in extending such standards to mercantile pursuits, street trades, and other occupations. By an act

C. Beginning of the public recognition of the evils, etc.—Continued.
4. The process of legislative reform, etc.—Continued.
(*g*) Laws relating to child labor, etc.—Continued.
passed in 1901 the employment of children under 12 years of age was prohibited in factories or workshops.
(*h*) In 1918 the Fisher Education Act was passed, which provides for the first time for the regulation of the employment of children in all gainful occupations, *including agriculture and domestic service.* It not only prohibits the employment of all children under 12, but also requires compulsory full-time school attendance of all children up to 14 years of age, and compulsory continuation school attendance of all children up to 16 years, the age to be raised to 18 at the end of seven years from the time the act becomes effective. (See Section VI, Outline 3, Topic III, A, 1.)

II. THE MOVEMENT IN THE UNITED STATES.[1]

A. Child labor up to the nineteenth century.
1. As in England prior to the establishment of the factory system, child labor was very common. The conditions under which children worked were not obviously harmful, and provision was usually made for a certain amount of education. Since work made children self-supporting and kept them from the temptations of idleness, child labor was regarded by practically every one as economically necessary and morally desirable.
2. The effect of the industrial revolution was similar to that in England, although the exploitation of children at the expense of their health and education was possibly not quite so great.

B. Early regulation of child labor by the States.
1. Early legislative efforts, as in England, failed to establish adequate standards or to make necessary provision for enforcement. Prior to 1830 no effective regulation of child labor was accomplished.
2. The lack of education among working children was the first evil to be recognized and the first for which legislative remedies were sought.

[1] Information regarding to laws passed before 1920, secured mainly from the following sources (full titles given in the Reading References): Abbott, Carlton, Ogburn, Summary of the Report on Condition of Woman and Child Wage Earners in the United States.

B. Early regulation of child labor by the States—Continued.
   2. The lack of education, etc.—Continued.
      (*a*) Connecticut, in 1813, passed a law providing for the education of working children by the proprietors of manufacturing establishments in which children were employed.
      (*b*) Massachusetts, in 1836, provided that children under 15 employed in manufacturing should attend school at least three months a year.
      (*c*) Prior to 1860 at least four other States (Rhode Island, Maine, New Hampshire, and Pennsylvania) had passed similar laws.
   3. The regulation of hours of work was the next step in child-labor legislation.
      (*a*) In 1842 Connecticut and Massachusetts passed laws restricting the employment of young children to 10 hours a day in certain manufacturing establishments.
      (*b*) Prior to 1860 similar legislation was passed in New Hampshire, Maine, Rhode Island, Pennsylvania, New Jersey, and Ohio.
   4. Commencing about the middle of the century, legislation began to be passed prohibiting the employment in manufacturing industries of children under certain ages in Pennsylvania (12 to 13 years), Rhode Island (12 years), Connecticut (9 to 10 years), and New Jersey (10 years).
   5. By 1860 some public recognition of the abuses resulting from early child labor and of the right of the State to correct these abuses by legislation had developed in the industrial States of the North. Only a few laws had as yet been passed, however, for the purpose of correcting and regulating these abuses, and these were for the most part found to contain inadequate provision for enforcement.

C. State child-labor legislation, 1860–1920.
   1. Laws prohibiting the employment of children below certain specified ages have in these years gradually been extended to include at least factories and in many cases a large number of other occupations in almost all States (see Section VI, Outline 4, Topic II, A), while the specified age minima have gradually been raised from 10 and 12 to 14, and in a few States to 15 and 16 years.

C. State child-labor legislation, 1860–1920—Continued.

1. Laws prohibiting the employment of children, etc.—Con.
   (*a*) Between 1884 and 1889 Colorado and New York passed the first laws providing for a 14-year minimum for both boys and girls (manufacturing).
   (*b*) While the child labor laws of the greater number of States to-day provide for a 14-year minimum for general industrial employment, most States have established higher age minima for employment in mines and at other occupations regarded as specially hazardous.
   (*c*) The trend of legislation is at present towards the establishment of 15 or 16 year age minima for all gainful occupations.
2. Further restrictions on the employment of young children have been effected in this period through legislation requiring certain educational qualifications for admission to employment.
   (*a*) The earliest form of this regulation required a definite period of schooling each year during the child's employment until he had reached a certain age, or in the year immediately preceding his first employment.
   (*b*) The ability to read and write simple English sentences was another early requirement.
   (*c*) The completion of a specified school grade was a requirement introduced in later legislation and is generally regarded as the most definite and satisfactory form of regulation.
   (*d*) At the present time 38 States restrict child labor directly through requiring some kind of an educational qualification of children entering employment, 26 of them requiring the completion of a specified school grade. (See Section VI, Outline 4, Topic I, B 3.)
3. Within comparatively recent years a further restriction on the numbers of children entering employment has been effected through the requirement of certain minimum conditions of health and physical development.
   (*a*) The earliest form of such regulation was effected through conferring on the factory inspector

C. State child-labor legislation, 1860–1920—Continued.

3. Within comparatively recent years, etc.—Continued.

authority to exclude from employment working children who were found, on physical examination, to be physically unfit to perform the work they were engaged upon.

(*b*) Other comparatively early laws required that the officers issuing work permits or employment certificates should have examined by a physician all children about whose physical condition they were in doubt.

(*c*) The most recent and satisfactory type of legislation requires that each child desiring to enter employment shall be examined by a public medical officer and shall not be permitted to work unless he is found to be of normal physical development, in sound health, and physically fit to perform the work which he is expecting to do.

(*d*) At the present time, physical requirements for the issuance of employment certificates are contained in the child-labor laws of 28 States, in 18 of which an examination by a physician is compulsory. (See Section VI, Outline 4, Topic I, C.)

4. During these years, legislation extending the age of compulsory full-time school attendance, and providing for the compulsory attendance of working children at continuation schools has been another important indirect means of restricting the numbers of child workers. (See Section VI, Outline 4, Topic I, B, 1, 2.)

5. Laws regulating the hours of children's work have been enacted in practically all industrial States. At the same time the working day has been gradually shortened so that the 8-hour day or 48-hour week for children under 16 is now found in 29 States. (See Section VI, Outline 4, Topic I, D.)

(*a*) The earliest laws provided for a 10-hour day and a 60, 58, 56, or 55 hour week.

(*b*) The first 54-hour-a-week law for children under 14 was passed in Michigan, between 1884 and 1889.

(*c*) The first 8-hour laws for children under 16 were passed in Illinois (any gainful occupation)

C. State child-labor legislation, 1860–1920—Continued.

5. Laws regulating the hours, etc.—Continued.

(*c*) The first 8-hour laws for children, etc.—Contd. and in Colorado (manufacturing) between 1889 and 1904.[1]

6. During the past 60 years legal prohibitions of the employment of children under 16 years of age at night have extended to 41 States. (See Section VI, Outline 4, Topic I, E.)

7. Special protection against dangerous, hazardous, or unhealthy occupations is a logical development. The first legislation of this sort is found in provisions of the penal codes of many of the States which make the employment of children in "vocations injurious to health or dangerous to life or limb" a misdemeanor.[2] Transferring this prohibition to the labor law and making the factory inspector responsible for its enforcement was the next step. While the language of these early provisions was so broad that it would seem to have included the employment of children under the prohibited age in occupations in which they were exposed to dangerous gases, poisons, and other health hazards, it was generally narrowly interpreted so as to include only immoral exhibitions, acrobatic performances, and other occupations usually described as vicious in themselves. About 1900 the policy of including in the child-labor laws a list of machines and of certain unhealthy occupations was begun.

8. Adequate legal provisions for the enforcement of child-labor laws have been established only comparatively recently. These consist of—

(*a*) Factory inspection.

(*b*) Requirement of a work permit or employment certificate. This measure is of more recent development, but such a working paper, guaranteeing the eligibility of children entering employment, is now required in all except three States. (See Section VI, Outline 4, Topic I, F.)

D. Federal regulation of child labor.

1. Attempts to secure Federal legislation, 1906–1916.

(*a*) In order to bring about uniformity in child labor legislation and its enforcement throughout the United States, numerous efforts were

[1] In 1887 Alabama passed an 8-hour law for children under 14, but it was repealed in 1894.

[2] New York, Acts of 1876, ch. 122; Wisconsin, Acts of 1880, ch. 239.

D. Federal regulation of child labor—Continued.

1. Attempts to secure Federal legislation, 1906–1916—Con.

(*a*) In order to bring about uniformity, etc.—Con. made during the decade 1906–1916 to secure the passage by Congress of a Federal child labor law.

2. Difficulty of securing such legislation.

(*a*) Such legislation was difficult to secure, not only because of the opposition from States having low child labor standards, but also because of the fact that under the Constitution of the United States the Federal Government does not reserve the right to regulate directly the conditions of labor in the various States.

3. The United States child labor act of 1916.

(*a*) On September 1, 1916, Congress passed the so-called Keating-Owen bill, which, in prohibiting the shipment in interstate or foreign commerce of goods produced in mines and quarries and in factories or in manufacturing establishments, mills, canneries, and workshops, in which children were employed in violation of certain age and hour standards, effectually established a Federal regulation of child labor.

(*b*) The law went into effect September 1, 1917, one year after its passage. It was administered by the Children's Bureau of the U. S. Department of Labor.

(*c*) On June 3, 1918, after it had been in operation 275 days, the law was declared unconstitutional by the Supreme Court of the United States on the ground that it was an undue extension of the power to regulate interstate commerce, four of the nine judges, however, dissenting from the majority opinion.

4. The child labor tax law. (See Section VI, Outline 4, Topic II.)

(*a*) On February 25, 1919, Congress enacted as a part of the Revenue Act a provision for the levying of a tax of 10 per cent on the annual net profits of any mill, cannery, workshop, factory, or manufacturing establishment, or of any mine or quarry employing children in violation of the age and hour standards es-

D. Federal regulation of child labor—Continued.

4. The child labor tax law—Continued.

(*a*) On February 25, 1919, etc.—Continued. tablished by the former Federal child labor law.[3]

(*b*) This act became operative on April 25, 1919, and is administered by the Office of Internal Revenue, U. S. Treasury Department.

E. The international regulation of child labor.

1. The Berne International Conference of 1913 recommended the prohibition of the employment at night of children under 16 years of age.

2. A draft convention with reference to the employment of children was adopted by the First International Labor Conference established under the League of Nations, held at Washington in November, 1919, as follows:

(*a*) Minimum age for entering industry: 14 years, except in Japan (minimum may be 12 for children who have finished the course in the elementary school), and India (minimum may be 12, in certain specified occupations).

(*b*) Night work between 10 p. m. and 5 a. m. Minimum age for night work: 18 years, except in specified industries (manufacture of iron and steel: glass works; manufacture of paper; manufacture of raw sugar; gold mining reduction work), where work must be continuous, where the minimum age is 16. Night work in coal and lignite mines may be permitted if ordinarily an interval of 15 hours, and in no case less than 13 hours, separates two periods of work.

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[3] The question of the constitutionality of this law is (Oct. 1, 1921) under consideration by the Supreme Court of the United States.

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OUTLINE 2. PRESENT EXTENT AND DISTRIBUTION OF CHILD LABOR IN THE UNITED STATES.

Approximately 2,000,000 children, 10 to 15 years old, inclusive, or almost one-fifth of the total child population of that age, were reported as employed in some wage-earning occupation at the Thirteenth Decennial Census (1910). Of these not more than one-sixth were employed in occupations affected by the Federal child-labor law and only about one-fifth in occupations affected by State child-labor laws. The great majority (72 per cent) were engaged in agricultural pursuits, chiefly as farm laborers, and were, therefore, subject to almost no direct legal regulation, either State or Federal. Compulsory schooling laws offer a means of indirect regulation.

I. SOURCES OF INFORMATION.

A. Publications of United States Census Bureau.

1. The Decennial Census of Population (Census of 1910. Vol. IV. Occupations) contains the only statistics of child labor for all occupations, and for the United States as a whole. The Thirteenth Census, taken in 1910, is the most recent enumeration for which figures are as yet available. The probability of important changes in the statistics of child labor since that date must be borne in mind. (See Section VI, Outline 2, Topic VI.)
2. The census of manufactures, taken every five years, contains less detailed and less complete statistics, but is useful in studying the trend of child employment in manufacturing industries between the decennial years.

B. Annual and biennial reports of State labor departments and bureaus of statistics, city school departments, etc., in many cases contain only fragmentary information and at best are useful chiefly in showing the changes in the extent of child labor from year to year.

II. SCOPE OF FEDERAL CENSUS STATISTICS.

A. The decennial census shows the number of persons 10 years of age and over in the United States reported as employed at the time of the enumeration.

B. It does not show—

1. The number of child workers *under 10 years of age*, which is considerable, especially in agricultural pursuits.
2. The number of children 10 years old and over who were *employed only during the summer vacation*, and were, therefore, reported as attending school and unemployed at the time of the enumeration (the census of 1910 was taken in April).

III. DISTRIBUTION OF CHILD WORKERS BY INDUSTRY AND OCCUPATION, UNITED STATES CENSUS OF 1910.

(See Tables XXIII and XXIV.)

A. Occupations usually not regulated by State child labor laws and not covered by the Federal child labor tax law.

1. Agricultural pursuits. Numbers employed: 1,432,428 children, or 72 per cent of the total number 10 to 15 years of age, inclusive, reported at work, and 13.2 per

A. Occupations usually not regulated, etc.—Continued.

1. Agricultural pursuits—Continued.

cent of the total number of children of that age in the United States. The greater number employed on home farms; but 259,813 reported as farm laborers, working out.

2. Domestic and personal service.[1] Numbers employed: 108,531, or 5.5 per cent of the working children 10 to 15 years of age, inclusive, and 1 per cent of the total child population of that age.

B. Occupations usually regulated by State child labor laws, but not covered by the Federal child labor tax law.

1. Clerical pursuits, trade, transportation, professional, and public service. Numbers employed: 166,606, or 8.4 per cent of the working children 10 to 15 years old.

TABLE XXIII.—*Children 10 to 15 years of age, inclusive, engaged in gainful occupations in 1910.*[a]

Industry and service group.	Total.		Boys.		Girls.	
	Number.	Per cent distribution.	Number.	Per cent distribution.	Number.	Per cent distribution.
All occupations	1,990,225	100.0	1,353,139	100.0	637,086	100.0
Agricultural pursuits, forestry and animal husbandry	1,432,428	72.0	1,022,251	75.5	410,177	64.4
Farm laborers (home farm)	1,157,323	58.2	807,261	59.7	350,062	54.9
Farm laborers (working out)	259,813	13.1	200,928	14.8	58,885	9.2
Other pursuits	15,292	.8	14,062	1.0	1,230	.2
Nonagricultural pursuits	557,797	28.0	330,888	24.5	226,909	35.6
Manufacturing and mechanical industries	264,570	13.3	151,854	11.2	112,716	17.7
Domestic and personal service	108,531	5.5	23,678	1.7	84,853	13.3
Clerical occupations	71,001	3.6	58,422	4.3	12,579	2.0
Trade	70,700	3.6	57,833	4.3	12,867	2.0
Transportation	20,802	1.0	18,499	1.4	2,303	.4
Extraction of minerals	18,090	.9	18,019	1.4	71	(b)
Professional service	3,566	.2	2,056	.2	1,510	.2
Public service, n. e. c.[b]	537	(c)	527	(c)	10	(c)

[a] Compiled from Thirteenth Census of the United States, 1910.
[b] Not elsewhere classified.
[c] Less than one-tenth of 1 per cent.

[1] Some of the occupations included in this classification by the census (such as work in barber shops, laundries, etc.) are in some States covered by State law.

B. Occupations usually regulated by State child labor laws—Contd.

TABLE XXIV.—*Children 10 to 15 years of age, inclusive, engaged in the leading child-employing manufacturing industries in 1910.*[1]

Industry.	Total.		Boys.		Girls.	
	Number.	Per cent children formed of total persons employed in specified industry.	10 to 13.	14 to 15.	10 to 13.	14 to 15.
Cotton mills	41,076	11.4	6,371	14,449	5,440	14,816
Clothing factories	23,271	3.4	417	5,849	696	16,309
Printing and bookbinding establishments	12,104	3.4	556	9,025	66	2,457
Knitting mills	11,364	10.5	631	2,532	922	7,279
Saw and planing mills	10,980	2.4	2,827	7,980	29	144
Cigar and tobacco factories	10,566	5.4	962	3,205	881	5,518
Shoe factories	9,426	4.3	177	5,379	93	3,777
Silk mills	9,299	9.7	149	2,713	284	6,153
Woolen and worsted mills	8,121	5.9	140	3,455	130	4,396
Glass factories	5,416	5.7	410	4,349	39	618
Furniture factories	4,158	2.6	428	3,326	58	346
Blast furnaces and steel rolling mills	3,986	1.0	270	3,479	10	227
Bakeries	3,690	2.5	252	2,306	52	1,080
Candy factories	3,511	8.2	52	769	108	2,582
Brick, tile, and terra-cotta factories	3,012	2.6	597	2,264	9	142
Paper box factories	2,342	10.2	22	429	55	1,836
Tinware and enamelware factories	2,187	2.9	99	1,554	39	495
Electrical supply factories	2,087	2.3	24	1,353	14	696

[1] Compiled from Thirteenth Census of the United States, 1910, vol. 4, pp. 314-410.

2. The principal occupations in which children in these pursuits were engaged: Messenger, errand and office boy (46,430), store clerk and sales person (31,174), newsboy (20,450), delivery boy (8,132), bundle and cash boy or girl (5,758), store laborer (5,741), telegraph messenger (4,612).

C. Occupations usually regulated by State child labor laws, and covered also by the Federal child labor tax law.

1. Manufacturing and mechanical pursuits. Numbers employed: 264,570 children, or 13.3 per cent of the total number 10 to 15 years old reported at work, and 2.4 per cent of the total number of children of that age in the United States. The leading child-employing manufacturing industries:

(*a*) According to the numbers of children employed: Textiles (cotton, knit goods, silk, and woolens), clothing, printing and bookbinding, saw and planing, cigar and tobacco, shoes, glass, furniture, blast furnaces and steel rolling, baking, candy making, brick, tile, and terra cotta manufacturing, paper-box manufacturing.

C. Occupations usually regulated by State child labor laws, etc.—Continued.

1. Manufacturing and mechanical pursuits—Continued.

(*b*) According to the proportion which children form of the total wage earners: Textile mills, paper-box factories, candy factories, glass factories, cigar and tobacco factories, shoe factories, clothing factories, printing and bookbinding, tinware and enamel-ware factories, furniture factories, brick, tile, and terra cotta factories, bakeries.

2. Extraction of minerals (mines and quarries). Numbers employed: 18,090 children, or 0.9 per cent of total number 10 to 15 years old reported at work, and 0.2 per cent of the total child population of that age in the United States. Of these, 15,270 were reported as employed in coal mines, 822 in iron mines, 681 in all other mines, and 1,207 in quarries.

IV. DISTRIBUTION OF CHILD WORKERS, BY STATES AND GEOGRAPHICAL DIVISIONS, UNITED STATES CENSUS, 1910.

(See Table XXV.)

A. Divisions in which the largest number, as well as the largest proportion, of children 10 to 15 years of age, inclusive, were employed in 1910:

South Atlantic	563,246
East South Central	441,890
West South Central	372,673

B. Divisions from which more than four-fifths of the agricultural child workers in the United States were reported:

South Atlantic	456,913
East South Central	396,203
West South Central	341,736

C. Divisions reporting largest numbers of children 10 to 15 years old, inclusive, engaged in manufacturing and mechanical pursuits in 1910:

Middle Atlantic	76,880
South Atlantic	55,201
East North Central	44,020
New England	40,291

TABLE XXV.—*Distribution of child workers by States and geographical divisions.*[1]

Divisions and State.	Children 10 to 15 years of age, inclusive, engaged in specified industry and service groups, in 1910.								
	All occupations.	Agricultural pursuits.	Manufacturing and mechanical industries.	Domestic and personal service.	Clerical occupations.	Trade.	Transportation.	Extraction of minerals.	Other occupations.
United States	1,990,225	1,432,428	260,944	112,157	71,001	70,700	20,802	18,090	4,103
New England	63,939	5,692	40,291	4,331	6,171	5,978	1,067	99	310
Maine	5,426	1,600	2,623	637	143	303	82	11	27
New Hampshire	3,759	543	2,539	320	91	201	44	10	11
Vermont	2,565	1,306	486	448	43	193	47	38	4
Massachusetts	32,745	1,131	21,637	1,764	3,995	3,399	612	27	180
Rhode Island	8,076	231	6,024	299	747	637	102	6	30
Connecticut	11,368	881	6,982	863	1,152	1,245	180	7	58
Middle Atlantic	187,781	29,453	76,880	19,961	29,681	18,201	4,145	8,352	1,108
New York	65,094	6,612	24,050	6,447	16,928	8,621	1,862	55	519
New Jersey	25,792	2,542	13,877	2,657	3,346	2,583	603	30	154
Pennsylvania	96,895	20,299	38,953	10,857	9,407	6,997	1,680	8,267	435
East North Central	176,240	76,935	44,020	17,635	14,512	17,095	3,448	1,788	807
Ohio	42,846	15,341	12,122	4,729	3,244	5,445	884	856	225
Indiana	33,693	17,981	7,345	2,910	1,302	2,839	570	585	161
Illinois	56,510	23,370	13,488	5,226	7,497	5,113	1,299	249	268
Michigan	19,293	8,292	4,992	1,827	1,285	2,322	403	80	92
Wisconsin	23,898	11,951	6,073	2,943	1,184	1,376	292	18	61
West North Central	142,046	103,348	12,685	10,817	4,929	6,616	2,333	876	442
Minnesota	18,364	13,373	1,264	1,921	615	793	302	22	74
Iowa	24,385	16,711	2,381	2,227	799	1,370	496	341	60
Missouri	52,702	35,134	7,206	3,570	2,745	2,720	816	298	213
North Dakota	7,352	6,283	144	667	41	118	86	.....	13
South Dakota	8,209	7,090	157	597	42	183	114	17	9
Nebraska	12,304	9,947	537	763	273	548	198	12	26
Kansas	18,730	14,810	996	1,072	414	884	321	186	47

South Atlantic	563,246	456,913	55,201	28,247	6,494	8,962	3,816	3,163	450
Delaware	3,656	2,185	644	433	189	150	44	1	10
Maryland	24,167	9,127	7,505	3,391	1,849	1,504	416	291	84
District of Columbia	1,345	52	152	391	255	365	96	.....	34
Virginia	61,879	44,312	6,733	7,023	818	1,536	760	632	65
West Virginia	23,802	16,566	2,197	1,762	292	718	377	1,851	39
North Carolina	144,632	120,832	16,444	4,733	695	1,108	689	89	42
South Carolina	117,252	102,105	10,215	3,432	492	747	305	19	27
Georgia	161,589	142,614	8,771	5,528	1,518	2,127	786	141	104
Florida	24,924	19,120	2,540	1,554	476	707	343	139	45
East South Central	441,890	396,203	17,338	14,984	2,890	4,917	2,236	3,011	311
Kentucky	64,692	53,209	4,092	3,892	948	1,313	433	708	97
Tennessee	83,956	70,692	5,108	4,240	825	1,414	725	868	84
Alabama	154,712	140,310	5,975	4,012	849	1,401	650	1,434	81
Mississippi	138,530	131,992	2,163	2,840	268	789	428	1	49
West South Central	372,673	341,736	9,193	11,479	3,010	4,375	2,224	293	363
Arkansas	92,450	87,522	1,711	1,725	339	651	346	98	58
Louisiana	59,732	49,435	3,046	4,399	1,136	1,171	465	16	64
Oklahoma	46,111	43,060	709	1,061	181	623	360	59	58
Texas	174,380	161,719	3,727	4,294	1,354	1,930	1,053	120	183
Mountain	22,188	15,057	1,779	1,961	904	1,298	661	413	115
Montana	1,764	1,053	125	252	61	137	111	9	16
Idaho	2,698	2,166	136	179	36	116	46	1	18
Wyoming	866	601	58	91	16	22	32	41	5
Colorado	5,864	3,197	624	542	471	573	206	217	34
New Mexico	5,806	4,750	317	406	40	111	104	69	9
Arizona	1,673	987	211	183	67	99	75	42	9
Utah	3,231	2,184	299	257	187	189	68	27	20
Nevada	286	119	9	51	26	51	19	7	4
Pacific	20,222	7,091	3,557	2,742	2,410	3,258	872	95	197
Washington	5,466	2,251	881	753	435	768	264	39	75
Oregon	3,505	2,000	436	360	165	392	135	5	12
California	11,251	2,840	2,240	1,629	1,810	2,098	473	51	110

[1] Compiled from Thirteenth Census of the United States, 1910, unpublished tables.

V. THE RELATION BETWEEN RURAL CHILD LABOR, ILLITERACY, AND SCHOOL ATTENDANCE.

A. The divisions and States in which both the largest numbers and largest proportions of children were employed were those for which were also reported:

1. The largest numbers of child farm laborers.
2. The highest proportions of illiterates among the population 10 years old and over.
3. The largest proportions of children not attending school.

TABLE XXVI.—*Rural child labor, illiteracy, and school attendance.*[1]

Divisions and States.	Children 10 to 15 years of age, inclusive, engaged in agricultural pursuits.		Percentage illiterate in the total population 10 years of age and over.	Percentage reported as attending school of children 6 to 14 years of age.
	Number.	Percentage of total child population 10 to 15 years of age.		
United States	1,432,428	13.2	7.7	81.1
New England	5,692	.9	5.3	91.9
Maine	1,600	2.1	4.1	89.2
New Hampshire	543	1.3	4.6	91.2
Vermont	1,306	3.5	3.7	92.9
Massachusetts	1,131	.3	5.2	92.9
Rhode Island	231	.4	7.7	88.8
Connecticut	881	.8	6.0	92.3
Middle Atlantic	29,453	1.4	5.7	88.4
New York	6,612	.7	5.5	90.0
New Jersey	2,542	.9	5.6	88.6
Pennsylvania	20,299	2.4	5.9	86.5
East North Central	76,935	3.8	3.4	89.1
Ohio	15,341	3.0	3.2	89.8
Indiana	17,981	5.9	3.1	88.2
Illinois	23,370	3.8	3.7	87.8
Michigan	8,292	2.7	3.3	90.7
Wisconsin	11,951	4.1	3.2	89.9
West North Central	103,348	7.4	2.9	87.5
Minnesota	13,373	5.2	3.0	88.8
Iowa	16,711	6.3	1.7	90.7
Missouri	35,134	9.1	4.3	85.2
North Dakota	6,283	9.0	3.1	80.7
South Dakota	7,090	10.0	2.9	83.3
Nebraska	9,947	6.8	1.9	90.2
Kansas	14,810	7.4	2.2	88.2
South Atlantic	456,913	27.7	16.0	70.3
Delaware	2,185	9.5	8.1	81.9
Maryland	9,127	5.9	7.2	80.2
District of Columbia	52	.2	4.9	86.7
Virginia	44,312	15.8	15.2	68.3
West Virginia	16,566	10.7	8.3	82.5
North Carolina	120,832	38.4	18.5	71.7
South Carolina	102,105	45.2	25.7	62.6
Georgia	142,614	38.3	20.7	65.6
Florida	19,120	20.2	13.8	66.0

[1] Compiled from the Thirteenth Census of the United States, 1910, vol. 1, pp. 1106, 1198, 352–409, and table of unpublished figures of the Thirteenth Census.

TABLE XXVI.—*Rural child labor, illiteracy, and school attendance*—Continued.

Divisions and States.	Children 10 to 15 years of age, inclusive, engaged in agricultural pursuits.		Percentage illiterate in the total population 10 years of age and over.	Percentage reported as attending school of children 6 to 14 years of age.
	Number.	Percentage of total child population 10 to 15 years of age.		
East South Central	396,203	34.5	17.4	70.2
Kentucky	53,209	17.7	12.1	76.0
Tennessee	70,692	24.4	13.6	72.1
Alabama	140,310	46.9	22.9	61.1
Mississippi	131,992	50.9	22.4	72.2
West South Central	341,736	28.4	13.2	69.3
Arkansas	87,522	40.9	12.6	70.1
Louisiana	49,435	21.6	29.0	54.6
Oklahoma	43,060	19.6	5.6	81.3
Texas	161,719	29.9	9.9	70.2
Mountain	15,057	5.3	6.9	81.7
Montana	1,053	3.0	4.8	82.7
Idaho	2,166	5.7	2.2	82.1
Wyoming	601	4.7	3.3	84.5
Colorado	3,197	3.9	3.7	86.7
New Mexico	4,750	11.6	20.2	72.9
Arizona	987	4.6	20.9	67.2
Utah	2,184	4.6	2.5	85.6
Nevada	119	2.0	6.7	83.2
Pacific	7,091	1.8	3.0	86.3
Washington	2,251	2.0	2.0	85.7
Oregon	2,000	3.0	1.9	85.5
California	2,840	1.4	3.7	86.9

VI. PROBABLE CHANGES SINCE 1910.

A. Causes for reduction of child labor, 1910–19.

1. Enactment in many States of laws embodying higher standards of child labor protection or compulsory schooling. The effect of these changes was already evident in the Census of Manufacturers of 1914, which shows for the United States as a whole a decrease of 24.6 per cent in the number of children under 16 engaged in manufacturing industries since 1909, as compared with an increase in the total number of wage earners of 6.4 per cent.
2. Improvement in administration of child labor and compulsory schooling laws.
3. Enactment of Federal child labor law.
4. Development of vocational courses in upper elementary grades and high school.
5. Back to school and stay in school movements.

B. Causes for increase in child labor, 1915–19.

1. Increased demand for labor during and following the war.
2. Increase in wages offered to children.

C. Reduction to prewar level.

The most recent statistics of children entering employment indicate that in a number of important child-employing cities, child labor, except where affected by new legislation, had not, up to January, 1921, been reduced to its prewar level.

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OUTLINE 3. THE CAUSES, SOCIAL COST, AND PREVENTION OF CHILD LABOR.

Poverty and ignorance are both cause and effect of child labor. Although a large proportion of the children who go to work as soon as the law allows give dissatisfaction with school as the direct cause, nevertheless it is chiefly in homes where poverty, past or present, has caused a low standard of living or ignorance of the value of education that this dissatisfaction results in the child's leaving school for work. Physical deterioration, moral defect, and industrial waste, as well as poverty, result from premature employment. While the enactment and the adequate enforcement of good child labor and compulsory school attendance laws are essential to the proper protection of children against industrial exploitation and loss of educational opportunity, only through more adequate incomes and the

improvement of our educational system can the problem of child labor be finally solved.

I. THE CAUSES OF CHILD LABOR.

A. Family necessity.

1. Investigations made in various cities have shown that from one-fourth to about one-third of the children entering industry before the completion of the elementary school course do so because of personal or family necessity.
   - (*a*) An intensive inquiry into the causes for leaving school for work in the case of 620 children in seven industrial centers located in Rhode Island, Georgia, Alabama, South Carolina, and Pennsylvania, based on the family income for the preceding year, showed that 30 per cent of the children entered employment because of family necessity. (See Summary of the Report on Condition of Woman and Child Wage Earners in the United States, pp. 263–264.)
   - (*b*) Over one-third of 168 workers under 16 years of age in Waltham, Mass., said that economic need was their chief reason for leaving school. (See Abels, From School to Work, p. 23.)
   - (c) Of 864 families having children under 16 years of age at work in the glass industry, there were 36.3 per cent in which the earnings of the children were necessary to maintain the family. (Ibid, p. 32.)
   - (*d*) Two-fifths of 823 children interviewed in connection with a study of working children of Boston, Mass., gave economic need as a reason for leaving school. (See Woodbury, Working Children of Boston.)
2. Many children go to work because their earnings are desired to raise the level of personal or family subsistence, although not absolutely necessary for support.
3. Even when not the primary cause poverty is an important secondary cause of early child labor, since many parents, deprived, generally through poverty, of an education in their youth, do not understand the value of education for their children, and permit them to go to work, even when the family income is sufficient to keep the child in school.

B. Failure of the schools to interest the child and to provide him with the right kind of training.

1. Investigations have shown that dissatisfaction with school is the sole reason for going to work in a large proportion of cases, and that in many others it is a contributing cause.

(*a*) The study of conditions under which 620 children left school to go to work (see Topic I, A, 1), previously mentioned, showed "that 48.9 per cent of the children studied were not satisfied at school, their attitude ranging from a mere dislike to a positive hatred of everything connected with the schools." (See Summary of the Report on Condition of Woman and Child Wage Earners in the United States, p. 33.) In 26.6 per cent of the cases, the child's dissatisfaction with school was the direct cause of going to work. (Idem, p. 264.)

(*b*) One-fifth of all the children interviewed in the study of working children of Boston stated that their reason for leaving school was that they were discontented with school. (See Woodbury, Working Children of Boston.)

(*c*) Almost 30 per cent of 168 children under 16 years of age working regularly in Waltham, Mass., gave dislike of school as their chief reason for leaving. (See Abels, From School to Work; p. 23.)

2. While many children undoubtedly leave school because of restlessness, impatience with discipline, and personal and family ignorance of the value of continued school training, the failure of the schools to provide the right kind of training for the needs of present-day life is an important cause of dissatisfaction with school.

(*a*) There is no adequate provision made in the upper grades of many schools to fit children for industrial life. The training is chiefly "bookish" and is intended to prepare for more training along the same lines. Its lack of practical appeal robs many children of any incentive to complete the elementary school and causes dissatisfaction among parents and children.

B. Failure of the schools, etc.—Continued.
2. While many children undoubtedly leave school because of restlessness, etc.—Continued.
(b) Children with no intellectual tastes, though in many cases with sufficient ability in practical work, get discouraged by repeated failure and leave school.
(1) A serious amount of retardation is found among working children.
(a) Less than half the regular workers in the study of the working children of Boston had completed normal grades. (See Woodbury, Working Children of Boston.)
(b) In a study of 620 working children (see Section VI, Outline 3, Topic I, A, 1), it was found that 83.3 per cent were above the average age of their classmates when they left school. (See Summary of Report on Condition of Woman and Child Wage Earners in the United States, p. 265.)
(c) The reclassification of children according to their intelligence and the formation of special classes have been urged as a means of reducing elimination caused by discouragement. (See Section IV, Outline 6, Topic II, A, 7.)
C. Ignorance of the physical, economic, and moral disadvantages of early child labor and of the advantages of continued school training on the part of—
1. The child.
(a) The child is eager to go to work because his friends are at work, because he wishes to be independent, and because he is attracted by the feeling of adventure and the freedom which entrance into industry brings.

C. Ignorance, etc.—Continued.

1. The child—Continued.

(*b*) He is too immature to have a definite ambition, too ignorant of industrial conditions to foresee the future, monotonous at best, which awaits him, and too unacquainted with fields of work where education counts to understand its value. When, if ever, the importance of education is realized, the opportunity has usually gone by.

2. The parent.

(*a*) The parent in many cases went to work as soon as the law allowed, and, without weighing the matter at all, expects his child to do the same.

(*b*) Some parents believe that it is good for children to go to work young, and that while they are in school they are merely "loafing" and acquiring habits of laziness.

(*c*) Even parents who realize dimly the value of education are not sufficiently impressed with its importance to make the effort required to keep children in school against their will.

(*d*) Some parents (probably comparatively few) look upon the child as an economic asset.

3. The employer.

(*a*) Many employers, who themselves entered industry at an early age, are sincere in their belief that premature labor does the child no harm. They are likely to consider isolated cases in which no apparent harm was done as typical, when, as a matter of fact, they are exceptional.

(*b*) Many are too shortsighted to see the economic waste involved, as long as a supply of cheap labor is available for immediate needs.

(*c*) Some employers believe that children are "necessary" to industry, and so acquiesce in the sacrifice. Experience has shown, however, that industries employing children are not injured when child labor is no longer available. Moreover, if an industry can not exist without child labor it has no right to exist, if only because child labor is too costly to industry itself to be permitted, even if its cost to society as a whole is ignored.

C. Ignorance, etc.—Continued.

4. The teacher.

(*a*) Many teachers are ignorant of conditions in the business and industrial world.

(*b*) Many teachers believe that "it is better for children to be at work than running the streets," failing to realize that idleness is not the sole alternative to child labor.

(*c*) Teachers in close contact with the child who is a misfit in the schools frequently believe that such children can not profit by an education, unaware that a solution may be found in reorganization of the educational system.

5. The public.

(*a*) The public, ignorant of real conditions, holds views similar to those of the parent, the employer, and the teacher.

(*b*) The public is in many cases preoccupied, indifferent, or blinded by selfish interests. It needs to be aroused to the dangers to society as a whole and to industry in particular, as well as to individuals, in premature child labor.

II. THE SOCIAL COST OF CHILD LABOR.

A. Health.

1. Employment during adolescence tends to be detrimental to normal physical development.

(*a*) These are the years of great growth.

(*b*) The growing body is peculiarly liable to overstrain.

(*c*) Much of the work that children do involves overstrain of one kind or another.

(*d*) Many children are employed at occupations for which they are unfitted by reason of physical defect or peculiarity.

(*e*) Employed children do not have time for sufficient play for proper physical development.

2. Children are more prone to accidents than adult workers.

(*a*) Their natural playfulness and ignorance of consequences make them more careless with machinery.

(*b*) Imperfect coordination of muscles renders them more liable to make some movement injurious in its consequences.

3. Children are more susceptible to industrial poisons than adult workers.

A. Health—Continued.

4. Certain occupations and industries have been recognized in legislation as especially dangerous to the health of the growing child. These include:
   (*a*) Work in and about mines and quarries.
   (*b*) Occupations involving night work.
   (*c*) Occupations involving exposure to the weather.
   (*d*) Occupations involving precarious and dangerous positions.
   (*e*) Home work, with unrestricted hours and often under insanitary conditions.
   (*f*) The glass industry, because of glass dust in the air, broken glass on the floor, intense heat, and sudden transitions from heat to cold.
   (*g*) The canning industry, chiefly because of long hours and insanitary living quarters.
5. Morbidity and mortality are higher among working than nonworking children.
   (*a*) Chronic maladies of nutrition and of the nervous system, especially, are common among working children. The necessity for speed frequently results in nervous exhaustion.
   (*b*) Sickness-insurance records show an extremely high rate of morbidity among youthful workers in Austria, one of the few countries where any study of the effects of work on young persons has been made, especially during the second year of working life when the injurious results of the occupation have had time to make themselves felt.
   (*c*) Study of the causes of death among cotton-mill operatives in Fall River shows that the death rate from tuberculosis among boys 15 to 19 years of age employed in cotton mills was nearly double that of boys not so employed, and among girls employed was more than double that of girls not so employed. (See Summary of Report on Condition of Woman and Child Wage Earners in the United States, p. 368.)
6. Underdevelopment, ill health, and deficiency in physical vigor result:
   (*a*) To the individual worker:
      (1) In low earning power.
      (2) In premature old age.

A. Health—Continued.

6. Underdevelopment, etc.—Continued.

(*b*) To the employer:

(1) In loss of industrial efficiency in his workers.

(*c*) To society:

(1) In physical deterioration of the race.

B. Education.

1. Illiteracy and lack of the rudiments of a general education result from early child labor. Although it is the tendency of modern legislation to prescribe an increasingly high age and educational standard for entrance into industry, a number of States still permit children to go to work before they have received the rudiments of elementary education. (See Section VI, Outline 4, Topic I, B.)

(*a*) Of 19,696 children between 14 and 16 who went to work in 1917 and 1918 in five States, the laws of which fix no educational minima, more than one-half had not completed the fourth grade, and more than one-fourth were unable to sign their names legibly. (See Administration of First Federal Child Labor Law.)

(*b*) Of 620 working children under 16 (See Section VI, Outline 3, Topic I, A, 1), less than one-fourth had reached the seventh grade, and only a little over one-half had reached the fifth grade. In one city, the proportion who had gone to work before reaching the fifth grade was 77.4 per cent. (See Summary of the Report on Condition of Woman and Child Wage Earners in the United States, p. 265.)

(*c*) Over one-third of 160 regular workers under 16 years old who had passed their fourteenth birthday before going to work had not reached the seventh grade. (See Abels, From School to Work, p. 26.)

(*d*) Little more than half of the 14 and 15 year old children taking out certificates during the period covered by the study of working children of Boston had completed the eighth or a higher grade. (See Woodbury, Working Children of Boston.)

B. Education—Continued.

2. Lack of trade training hampers the child worker. Even if he has had the rudiments of a general education, the child of 14 or 15 has usually had no special training qualifying him for work at any skilled trade. Consequently, he enters an unskilled or "blind-alley" occupation, which offers little or no opportunity for training for a more skilled or better-paid job.

(*a*) According to the findings of a Massachusetts inquiry, 98 per cent of the children in that State who begin work between 14 and 16 are employed in unskilled or low-grade skilled industries. It was found in this same inquiry that in the textile industry "two years may and four years will bring the average maximum wage." (Report of the Massachusetts Commission on Industrial and Technical Education, 1906, pp. 31 and 45.)

3. Long hours of monotonous work blunt the child's undeveloped faculties and offer little or no opportunity for mental development.

C. Poverty and dependency.

1. The child worker, handicapped by the lack of education, can enter only unskilled trades in which his maximum earning capacity is soon reached. In some trades, when the child becomes too old for a child's job, he is replaced by other child workers, and can not find other employment because he is trained for no other work.

(*a*) In more than two-thirds of the cases studied in a Government investigation (see Topic I, A, 1), "where the boys were intelligent enough to have a definite ambition, the work they were doing was in no way related to their ambition and afforded no possible opportunity of furthering it. Among the girls there was even less connection between occupation and ambition." (See Summary of the Report on Condition of Woman and Child Wage Earners in the United States, p. 267.)

2. Poverty and probable dependency in old age are the lot of a large proportion of former child workers, who in their turn become the fathers of the child workers of the future.

C. Poverty and dependency—Continued.
   3. Entering into competition with adult workers, child labor lowers the standard of adult wages.
D. Delinquency.
   1. Investigations have shown that delinquency is much more common in working than in nonworking children.
      (*a*) In an investigation of 4,278 delinquent boys and 561 delinquent girls it was found that 56.5 per cent of the boys and 62.2 per cent of the girls were working children. "By comparing the number of the working and nonworking delinquents with the census figures for working and nonworking children in the places studied it is shown that the workers are disproportionately numerous." Sixty-five and eight-tenths per cent of the "repeaters" were working children, 34.2 per cent nonworking. (See Summary of the Report on Condition of Woman and Child Wage Earners in the United States, pp. 273–274.)
   2. While this difference may be due in part to the less desirable home environment of the working child, it is due in many instances to the comparative freedom from restraint enjoyed by working children and to the demoralizing effects of the occupations which children enter.
      (*a*) In the investigation cited above, among the boys employed at the time of arrest the largest proportion from any one occupation (21.83 per cent) came from newsboys, errand boys coming next with 17.8 per cent. Among girls employed when arrested domestic service yielded the largest proportion of delinquents (53.95 per cent), textile industries following with 12.36 per cent. (See Summary of the Report on Condition of Woman and Child Wage Earners in the United States, p. 277.)
E. Industrial waste.
   1. Early child labor results in a physically subnormal race of adult workers.
   2. Lack of education results in a great loss of potential industrial ability.
F. Social and political loss.
   1. Without education, the child worker can seldom develop into a leader.

F. Social and political loss—Continued.

2. Not only does society lose many potential leaders, but also many more citizens capable of intelligent civic action.

III. THE PREVENTION OF CHILD LABOR.

A. Legislation.

1. Adequate child labor and school attendance laws adequately administered are, under existing conditions, necessary to ensure children protection against the evils of premature employment.

(*a*) The Fisher Education Act, 1918, of England is a noteworthy example of how child labor may be reached through school attendance laws.

(1) It provides for full-time school attendance with no exemptions up to the age of 14, thus establishing a minimum age of 14 years for entrance upon all occupations during school hours, including agriculture, throughout the country.

(2) It permits local authorities to raise the minimum age to 15.

(3) It requires attendance at a continuation school up to 16 years, to be raised to 18 years at the end of seven years from the time the act becomes effective.

(4) It enables continuation schools to carry on medical inspection.

(5) It permits the establishment by local authorities of holiday camps or physical recreation clubs for young people up to 18.

B. Readjustment in our economic life.

Without such readjustments as will ensure the following conditions, no just and final solution can be found through legislation alone.

1. A wage earned by the father, sufficient to maintain a decent standard of living.

2. An adequate system of State aid to widows and dependent children.

C. An educational system which will offer to children a real training for present-day life, work, and citizenship.

1. The revision of our educational system requires:

(*a*) More schoolhouses, better built and better equipped.

C. An educational system, etc.—Continued.
   1. The revision of our educational system—Continued.
      (*b*) More teachers, better trained and better paid.
      (*c*) A revision of the curriculum so that every child may be given training best suited to his tastes and ability.
      (*d*) The general introduction of vocational training in the school curriculum.
      (*e*) Provision for part-time and evening classes in trade training, trade extension, and general education for workers of all ages. (See Section VI, Outline 5, Topic I, C.)

D. The education of public opinion. The dissemination of knowledge based on the results of scientific investigations of the social, physical, and industrial cost of child labor.

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OUTLINE 4. THE PRESENT LEGAL STATUS OF CHILD LABOR IN THE UNITED STATES (JAN. 1, 1921).

In all except four States the minimum age for work at least in factories and often in many other employments is placed as high as 14 years, and seven States have an age minimum of 15 years or over. Twenty-nine States provide an eight-hour day for children under 16 and 41 prohibit their work at night.[4] In addition, the Federal child-labor tax law, which imposes a tax of 10 per cent upon the net profits of any mine, quarry, mill, cannery, factory, workshop, or manufacturing establishment failing to comply with certain minimum age and hour requirements, has rendered unprofitable the employment of children in violation of those standards.

Neither State nor Federal laws have minimum age provisions applying specifically to work in agricultural pursuits or domestic service. Although a few State laws apply to "all gainful occupations" and would therefore nominally cover farm work and housework, practically the only prohibition of this type of child labor is that which results indirectly from the operation of the compulsory school-attendance laws. Its effectiveness, therefore, depends wholly upon the strictness with which these laws are enforced.

Certain of the important phases of child-labor regulations are summarized[5] below.

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[4] These general statements take no account of limitations upon the application of the laws or of exemptions, which often decidedly weaken the provisions. For details, see summary below.

[5] In analyzing these provisions the States are usually arranged in groups, the basis of classification being the attainment of certain standards of protection of children from early labor, long hours, and other industrial hazards. But it should be remembered that such a classification is at best but a rough approximation of the actual position of any State in regard to its restrictions upon child labor. The laws of the various States are so differently expressed, and many of them are so burdened with exemptions the actual effect of which can not be determined, that accurate classification is impossible. For instance, a State with a minimum age of 15 years with exemptions permitting children over 12 to work under certain conditions may actually afford much less protection to its children than one with a minimum age of 14 with no exemptions. Moreover, the exemptions may be of such widely varying degrees of importance that the fact that two States are classified under the same heading does not necessarily imply that their standards are even approximately the same.

With the exception of the provisions under I–A–3, which do not include legislation passed in 1920, all the statements made are as of Jan. 1, 1921. They should be revised for current use from year to year by reference to later publications of the Federal Children's Bureau and of other agencies and organizations compiling legislation relating to children.

I. REGULATION BY THE STATES.

A. Age minimum.[6]

1. In factories, stores, etc. (This minimum age applies to work in at least factories and stores, and often to other occupations, with or without exemptions, as indicated. Lack of any regulation for stores is classed as an exemption. Exemptions not applying to factories and stores do not affect the classification of a State.)

   (*a*) Over 14 years (without exemptions)—1 State: Ohio (boy 15, girl 16).

   (*b*) Over 14 years (with exemptions limited to outside school hours)—3 States: Maine (15), Michigan (15), South Dakota (15). (See also Idaho, under "*e*.")

   (*c*) Over 14 years (with exemptions not limited to outside school hours)—3 States: California (15), Montana (16), Texas (15).

   (*d*) Fourteen years (without exemptions)—13 States: Connecticut, Illinois, Kentucky, Louisiana, Maryland, Massachusetts, Nebraska, New Hampshire, North Dakota, Oregon,[7] Pennsylvania, Rhode Island, Tennessee.

   (*e*) Fourteen years (with exemptions limited to outside school hours)—13 States: Alabama, Arizona, Arkansas, Colorado, Idaho,[8] Indiana, Kansas, Minnesota, Nevada, New Jersey, New York, West Virginia, and Wisconsin.

   (*f*) Fourteen years (with exemptions not limited to outside school hours)—8 States and the District of Columbia: Delaware, District of Columbia, Iowa, Missouri, North Carolina, Oklahoma, Vermont, Virginia, and Washington.

   (*g*) Lower than 14 years—7 States: Florida (14 for factories, 12 for stores), Georgia (14 for factories, with exemptions not limited to outside school hours; no age minimum for stores),

[6] For compulsory school-attendance provisions, which may sometimes indirectly affect the minimum age for employment during school hours, see B–1.

[7] The only exemption is for employment during school vacation of two weeks or more, which is permitted to child over 12 in work not detrimental to health or morals in judgment of State board of inspectors of child labor. Board interprets this to exclude work in factories and stores (except errands for small stores not in congested districts).

[8] Compulsory school attendance law in effect raises the minimum age to 15 for employment during school hours (child whose bodily or mental condition renders attendance at school inexpedient exempted).

A. Age minimum—Continued.

1. In factories, stores, etc.—Continued.

(*g*) Lower than 14 years—Continued.

Mississippi (boy 12, girl 14, for factories; no age minimum for stores), New Mexico (no age minimum),[9] South Carolina (14 in factories; no age minimum for stores), Utah (no age minimum[9]), Wyoming (no age minimum[9]).

2. In mines and quarries (for boys).

(*a*) At least 16 in both mines and quarries (without exemptions)—23 States: Alabama, Arizona, Arkansas, California, Connecticut, Illinois, Kansas, Kentucky, Maryland, Nevada, New York, North Carolina, Ohio, Oklahoma, Oregon,[10] Pennsylvania, Tennessee, Texas, Utah, Vermont, Virginia, West Virginia, Wisconsin. (See also Florida, under "*g*.")

(*b*) At least 16 in mines, 14 in quarries (without exemptions)—one State: New Jersey.

(*c*) Sixteen in mines (without exemptions); no provisions for quarries—four States: Colorado, Missouri, Montana, North Dakota.

(*d*) Sixteen in mines (with exemptions); no provisions for quarries—two States: Iowa (16 during school term; 14 at any time), Washington.

(*e*) Lower than 16 in mines and quarries—four States: Delaware (15), Indiana (14), New Hampshire (14 in quarries; no provisions for mines), Rhode Island (mines and quarries not specified, but act fixing a minimum age of 14 in factories, etc., applies to every person, firm, or corporation employing any child under 16, "whatever the business conducted").

(*f*) Lower than 16 in mines (without exemptions); no provisions for quarries—eight States: Idaho (14), Louisiana (14), Michigan (15), Minnesota (14), New Mexico (14), South Carolina (14), South Dakota (15 during school hours; 14 at any time), Wyoming (14).

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[9] No age minimum except that fixed indirectly by the compulsory school attendance law for work during school hours. Certain specific dangerous or injurious manufacturing processes are prohibited under 16 in Utah and under 14 in Wyoming.

[10] No minimum age specified in law, but board of inspectors of child labor, under its power to refuse to issue certificates to children not physically able to do work required, refuses to issue certificates to children under 16 to work in mines or quarries.

A. Age minimum—Continued.

2. In mines and quarries (for boys)—Continued.

(*g*) No minimum age provisions specified in law for either mines or quarries—six States and the District of Columbia: District of Columbia, Florida,[11] Georgia, Maine, Massachusetts, Mississippi, Nebraska.

3. In occupations dangerous to life or limb or injurious to health or morals.[12]

(*a*) Most States have laws prohibiting children under specified ages from work in at least a certain number of dangerous or injurious occupations. Much variation is found both in the number and the type of occupations and processes prohibited, but many of the laws enacted within the past 10 years follow rather closely the sections of the so-called "Uniform child-labor law" relating to this subject.[13]

(*b*) Determination of dangerous or injurious occupations by State boards. In the following 16 States a State board of labor or of health has authority to determine what occupations or processes are dangerous or injurious to children under specified ages, usually 16 or 18, and to prohibit their employment therein: Arizona, Arkansas, California, Delaware, Massachusetts, Michigan, Missouri, Nevada, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Utah, West Virginia, Wisconsin.

B. Educational minimum.

1. Compulsory attendance at all-day school (all laws have exemptions, many of them seriously crippling the effect of the compulsory provision) required up to the age of—

(*a*) Eighteen years: Five States—Montana (continuation school law, in force only in first-class districts; elsewhere 16), Oklahoma, Oregon, Utah, Washington (where continuation schools are established; elsewhere 16).

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[11] State labor inspector classes work in mines and quarries as a dangerous occupation and prohibits employment of children under 16 therein.

[12] Data under this subdivision have been revised only to Jan. 1, 1920.

[13] See secs. 3, 4, 5, 18, 19, and 21 of the uniform child labor law.

B. Educational minimum—Continued.

1. Compulsory attendance at all-day schools—Continued.

(*b*) Seventeen years: Three States—Delaware (outside Wilmington; 14 in Wilmington), Maine, North Dakota. (See also Maryland, under "*c*.")

(*c*) Sixteen years: Thirty-two States—Alabama, Arizona, California, Colorado, Connecticut, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky (in cities of first, second, third, or fourth class; in county school districts, to 17), Louisiana (in parish of Orleans; elsewhere 14), Maryland (in Baltimore City; elsewhere 17), Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, Ohio, Pennsylvania, Rhode Island, South Dakota, Tennessee, Vermont, West Virginia, Wisconsin.

(*d*) Fifteen years: One State—Arkansas.

(*e*) Fourteen years: Six States and the District of Columbia—District of Columbia, Georgia, Mississippi (county may release itself from act by majority vote of qualified electors), North Carolina (act not in force in any county having a higher compulsory education law), South Carolina, Texas, Wyoming.

(*f*) Twelve years: One State—Virginia (if illiterate).

2. Compulsory continuation school attendance for employed children required (under certain specified conditions) up to:

(*a*) Eighteen years: Ten States—California, Illinois (to 16, Sept. 1, 1921; to 17, Sept. 1, 1922; to 18, Sept. 1, 1923), Michigan, Montana, Nevada, New York, Oklahoma, Oregon (evening school attendance accepted as substitute), Utah, Washington.[14] (See also Missouri, under "*c*.")

(*b*) Seventeen years: One State—Wisconsin.

(*c*) Sixteen years: Eleven States—Arizona, Indiana (local school authorities may establish schools and require attendance), Iowa, Kentucky,[15]

[14] Attendance compulsory after schools have been established; no compulsory provision for establishment.

[15] Attendance compulsory after schools have been established; no compulsory provision for establishment.

B. Educational minimum—Continued.

2. Compulsory continuation school attendance, etc.—Contd.

(*c*) Sixteen years—Continued.

Massachusetts, Missouri (18 for those who have not completed elementary school course), Nebraska, New Jersey, New Mexico, Ohio,[15] Pennsylvania.

3. Educational requirements for regular employment certificates. (Compulsory school attendance provisions which in effect may raise these requirements for certain States are not included. Grade of school work required only is given, without regard to such additional requirements as ability to read and write English.)

(*a*) Completion of seventh or eighth grade or of "common" or "grammar" school course. (See also under "*b*," "*c*," and "*d*.") Seven States: California, Kansas, Minnesota, Montana, Oregon (ruling of industrial welfare commission), Vermont, Wisconsin.

(*b*) Completion of eighth grade; or literacy in English and attendance at evening school: One State—Nebraska.

(*c*) Completion of 8th grade for child 14 to 15 (with exemptions); no requirement for child 15 or over: One State—Washington (according to continuation school law).

(*d*) Completion of sixth grade: Eight States—Iowa, Maine, Massachusetts (such ability to read, write, and spell in English as is required for completion of sixth grade), Michigan, New York (eighth for child under 15), Ohio (for boys, seventh for girls), Pennsylvania, West Virginia.

(*e*) Completion of fifth grade: Seven States—Arizona, Delaware, Illinois, Indiana, Kentucky, Maryland, New Jersey.

(*f*) Completion of fourth grade: Two States—Alabama and Arkansas.

(*g*) No grade specified; proficiency in certain subjects required (usually ability to read and write English, or ability to read and write English and perform simple operations in

[15] Attendance compulsory after schools have been established; no compulsory provision for establishment.

B. Educational minimum—Continued.

3. Educational requirements, etc.—Continued.

(*g*) No grade specified—Continued.

arithmetic). Eleven States and the District of Columbia: Colorado (evening school attendance accepted as substitute), Connecticut, District of Columbia, Florida, Idaho(requirement specified, but no mention made of certificate), Missouri, New Hampshire, North Dakota, Oklahoma (specified school attendance may be substituted), Rhode Island, South Dakota (specified school attendance, or lawful excuse therefrom, may be substituted), Tennessee (by implication from compulsory school attendance law).

(*h*) No requirement other than specified school attendance during preceding year: One State—Georgia.

(*i*) No educational requirement: Ten States—Louisiana, Mississippi, Nevada, New Mexico, North Carolina (State child welfare commission may make rulings concerning issuance of employment certificates), South Carolina, Texas, Utah, Virginia, Wyoming (no provision for employment certificates).

C. Physical minimum. (This summary covers only requirements of physical examinations for regular employment certificates. Examinations to determine age are not included.)

1. Examination by physician before child goes to work mandatory: Eighteen States—Alabama, Arizona, California, Connecticut, Delaware, Illinois, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Ohio (previous record of school physician showing child sound in health may be substituted), Pennsylvania, Rhode Island, West Virginia. (See also Wisconsin, under "2.")

2. Examination by physician before child goes to work optional with issuing officer: Ten States and the District of Columbia—District of Columbia,[16] Florida, Maine, Michigan, Missouri, Nebraska, North Carolina,[17] North Dakota, Oklahoma, Oregon,[16] Wisconsin

[16] Issuing officer must certify to child's physical fitness; therefore he might call upon a physician to do so.

[17] Employment certificate, however, is not specifically demanded by the law, but if obtained it is prima facie evidence that child is of legal age for employment.

C. Physical minimum—Continued.

2. Examination by physician, etc.—Continued.
(required in Milwaukee for all applicants for first regular employment certificates, by order of industrial commission.)

3. No provision for requiring examination by physician before child goes to work (except in some States to determine age): Twenty States—Arkansas, Colorado, Georgia, Idaho, Indiana,[18] Kansas, Louisiana, Mississippi, Montana, Nevada, New Mexico, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, Wyoming.

D. Maximum hours. (The provisions here given are those applying, unless otherwise indicated, to children under 16 in factories and stores. The same regulations in some cases apply to other occupations and also to children up to 18 or 21 years of age, to all females, or to all employees. Lack of any regulation for stores is classed as an exemption.)

1. Maximum working day 8 hours, or not over 48 hours permitted per week (without exemptions): Twenty States and the District of Columbia—Alabama, Arizona, Arkansas, California, District of Columbia, Illinois, Kansas, Kentucky, Massachusetts, Minnesota, Nebraska, Nevada, New Jersey, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, Washington, West Virginia, Wisconsin.

2. Maximum working day 8 hours, or not over 48 hours permitted per week (with exemptions): Twelve States—Colorado, Indiana (9 per day, 54 per week, with written consent of parent, etc.), Iowa, Maryland, Mississippi (boys in cotton and knitting mills exempted), Missouri, Montana,[19] New York, Texas (10-hour day and 48-hour week, under 15), Utah (boy under 14, girl under 16), Vermont, Virginia.

3. Maximum working day 9 to 10 hours or over, and 54 to 60 hours permitted per week (with and without exemptions): Fifteen States—Connecticut, Delaware, Florida, Georgia, Idaho, Louisiana, Maine, Michigan, New Hampshire, North Carolina, Pennsylvania, Rhode Island, South Carolina, South Dakota, Wyoming (under 14 and all females).

[18] If specified evidence of age is not available, issuing officer may certify that in his opinion child is 14 or over and physically fit for intended work.

[19] Montana is classified here because work of children under 16 is prohibited entirely in factories; no provisions for stores except the hours-of-labor law applying to females.

D. Maximum hours—Continued.

4. No provisions fixing maximum hours of labor for children under 16: One State—New Mexico.

E. Prohibition of night work. (The provisions here given are those applying to children under 16, unless otherwise indicated, in factories and stores. The same regulations in some cases apply to other occupations and also to children up to 18 or 21 years of age or to all females. Lack of any regulation for stores is classed as an exemption.)

1. Night work prohibited (without exemptions): Twenty-four States and the District of Columbia—Alabama, Arizona, Arkansas, California, District of Columbia, Idaho, Illinois, Indiana, Kansas, Kentucky, Massachusetts, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Washington, West Virginia, Wisconsin.

2. Night work prohibited (with exemptions): Eighteen States—Colorado, Connecticut, Delaware, Florida, Georgia (under 14½), Iowa, Louisiana, Maine, Maryland, Michigan, Mississippi (boys 14 to 16 in cotton and knitting mills exempted), Missouri, Montana,[20] New York, Oklahoma, South Carolina, Vermont, Virginia.

3. No night-work prohibition for children under 16: Six States—Nevada, New Mexico, South Dakota, Texas, Utah, Wyoming.

F. Administrative provisions (child-labor laws).

1. Employment certificates or work permits are required for children employed in factories (and in most States also in stores and other occupations) in 45 States and the District of Columbia (ages covered extend at least up to 16 unless otherwise indicated):

(*a*) Issued by local public-school official or his appointee (in 3 cases some other official also may issue, as indicated): Thirty-one[21] States and the District of Columbia—Alabama, Arizona, Arkansas (or by State commissioner of labor and statistics), California, Colorado (or by superintendent or principal of a parochial

[20] Montana is classified here because work in factories is entirely prohibited for children under 16; no night-work prohibition for stores.

[21] Not including New Hampshire, where local public school authorities issue certificates, but are under the supervision of the State board of education, or Maryland, where local school superintendents may issue only outside Baltimore. See under "c." (See also "b.")

F. Administrative provisions (child-labor laws)—Continued.

1. Employment certificates, etc.—Continued.

(*a*) Issued by local public school official, etc.—Con. school), Delaware (outside Wilmington, if school official fails or refuses to issue certificates, chairman of labor commission may designate some person as issuing officer); District of Columbia, Florida, Georgia (14 to 14½), Illinois, Indiana, Iowa, Kansas (or by judge of juvenile court), Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Jersey, New Mexico,[22] North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Tennessee, Utah, West Virginia.

(*b*) Issued by local public school official (continuation school law) and by judge (labor law): Two States—Nevada, Washington.

(*c*) Issued under State supervision: Eight States—Connecticut (State board of education); Maryland (State board of labor and statistics must issue in Baltimore and may issue elsewhere[23]); New Hampshire (local school officials issue certificates, but the State board of education, through its power to enforce the certificate law, has the work under its control); North Carolina (State child welfare commission, which enforces the child labor law, appoints the issuing officers and prescribes the conditions under which certificates[24] shall be granted); Oregon (State board of inspectors of child labor either itself issues or appoints the issuing officers and directs the work); South Carolina (commissioner of agriculture, commerce, and industries issues permits based upon the parents' affidavits, which are obtained by the employer

[22] Employment certificate is not directly demanded as a prerequisite for employment, but the compulsory education law requires attendance at school of all children between 6 and 16 years of age not physically or mentally incapacitated, or living more than 3 miles from a public school, unless they are 14 and excused to enter employment by the issuance of such a certificate.

[23] Local school superintendents have coordinate authority outside Baltimore. The board issues certificates in Baltimore and in its branch offices; elsewhere the school superintendents appoint the issuing officers.

[24] The certificate is not specifically required by the law, but if obtained it is prima facie evidence that child is of legal age for employment.

F. Administrative provisions (child-labor laws)—Continued.

1. Employment certificates, etc.—Continued.

(*c*) Issued under State supervision—Continued. and forwarded to him); Vermont (commissioner of industries); Wisconsin (industrial commission issues in Milwaukee and appoints issuing officers elsewhere and supervises their work).

(*d*) Issued by State factory inspector or city factory inspector, or, if specified evidence of age is not available, by judge of juvenile or district court: One State—Louisiana.

(*e*) Issued by local health official: One State—New York.

(*f*) Issued by notary public: One State—Virginia.

(*g*) Issued by judge (see also under "*a*," "*b*," and "*d*"): One State—Texas. (This is not the usual type of employment certificate, but a temporary permit issued to child permitted to be employed under the legal working age—15.)

2. Employment certificates or work permits are not required for employed children: Three States—Idaho (employer must keep "age records" of children 14 to 16); Mississippi (employer required to obtain parent's affidavit of age and school attendance before employing child 14 to 16); Wyoming.

3. Inspection and penalties.

Provisions for the inspections of factories, stores, and other work places affected by the law and for the penalizing of offenders are provided for in the child-labor laws of almost all States. These provisions and the means for carrying them out vary, however, greatly from State to State, as does the effectiveness with which they are administered.

II. FEDERAL REGULATION.

The provisions here given are those of the child-labor tax law, which does not specifically prohibit the employment of children, but which imposes a tax of 10 per cent upon the net profits of mines and quarries, mills, canneries, factories, workshops, and manufacturing establishments, in which children are employed contrary to certain age and hour standards.

A. Age minimum:
   1. In mills, canneries, factories, workshops, and manufacturing establishments: Fourteen years (without exemptions).
   2. In mines and quarries: Sixteen years (without exemptions).

B. Educational minimum: None.

C. Physical minimum: None.

D. Maximum hours for children under 16:
   1. In mills, canneries, factories, workshops, and manufacturing establishments: Eight hours per day, 48 hours per week, and 6 days per week.

E. Prohibition of night work for children under 16:
   1. In mills, canneries, factories, workshops, and manufacturing establishments: Between 7 p. m. and 6 a. m.

F. Administrative provisions:
   1. Employment certificates: Under the Federal act employment certificates or working permits are not required for entrance to employment, but the act provides for their issuance as a protection to employers against unintentional liability to the tax. An employer is not held liable to the tax if "the only employment or permission to work which * * * would subject him to the tax, has been of a child as to whom such person has in good faith procured at the time of employing such child or permitting him to work, and has since in good faith relied upon and kept on file a certificate issued in such form, under such conditions, and by such persons as may be prescribed by a board consisting of the Secretary [of the Treasury], the Commissioner [of Internal Revenue], and the Secretary of Labor, showing the child to be of such age as not to subject such person to the tax imposed by this title." In order to save expense and prevent unnecessary duplication of work the act provides for the acceptance for the purposes of the Federal act of certificates issued under State laws and by State authorities wherever these are issued in conformity with the requirements of the Federal authorities. Under the former Federal child-labor act, which contained similar provisions with reference to certificates of age, 39 States and the District of Columbia were designated as States in which State employment certificates or working permits should have the same force and effect as Federal age certificates. In addition, Federal certificates

F. Administrative provisions—Continued.
1. Employment certificates—Continued.
were regularly issued in five States in which no State certificates were issued, or in which certificates were issued under conditions not consistent with the standards established by the Federal Child Labor Board.
2. Inspection: Authority to enter and inspect at any time any mine, quarry, mill, cannery, workshop, factory, or manufacturing establishment is granted by the act to—
(*a*) The Commissioner of Internal Revenue or any person duly authorized by him.
(*b*) The Secretary of Labor or any person duly authorized by him, for the purpose of complying with a request of the Commissioner of Internal Revenue to make such an inspection.

III. SUMMARY.

A somewhat more complete outline for analyzing the provisions of laws affecting the employment of children is as follows:

A. Prohibition of employment.
1. Age minimum in—
(*a*) The more common child-employing industries, such as factories and stores.
(*b*) Occupations dangerous to life or limb or injurious to health or morals (excluding "*c*" and "*d*").
(1) Prohibitions of specific occupations by law.
(2) Powers of administrative bodies and rulings made by them.
(*c*) Street trades.
(*d*) Public exhibitions.
(*e*) Home work (sweatshop).
(*f*) Agricultural pursuits.
(*g*) Domestic service.
2. Enforcement.
(*a*) Enforcing officials.
(*b*) Penalties.

B. Compulsory school attendance.
1. At day schools.
(*a*) Requirement of attendance.
(1) Children affected.
(2) Attendance required.

B. Compulsory school attendance—Continued.
1. At day schools—Continued.
(*b*) Enforcement.
(1) Enforcing officials.
(2) Penalties.
2. At continuation and evening schools.
(*a*) Requirement of attendance.
(1) Children affected.
(2) Attendance required.
(3) Establishment of schools.
(*b*) Methods of enforcement.
(1) Enforcing officials.
(2) Penalties.

C. Regulation of children at work.
1. Certificate provisions.
(*a*) Requirements for issuance.
(1) Evidence of age.
(2) Educational requirements.
(3) Physical requirements.
(4) Promise of employment.
(5) Other (such as necessity for support of family, etc.).
(*b*) Administration.
(1) Issuing officer.
(2) Return of certificate when child leaves employment.
(3) Other provisions.
2. Hours and conditions of work.
(*a*) Maximum hours.
(*b*) Prohibition of night work.
(*c*) Sanitation of work places.
3. Enforcement.
(*a*) Enforcing officials.
(*b*) Penalties.

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OUTLINE 5. VOCATIONAL EDUCATION AND GUIDANCE IN THE UNITED STATES.

Vocational education in its narrowest sense is that education which fits the individual to earn a livelihood in a particular occupation. The best vocational training, however, aims not only to teach certain processes, but also to show how those processes are related to the vocation as a whole, in order that the worker, through a comprehensive grasp of fundamental principles, may realize to the fullest possible extent the dignity and interest of his vocation and its value to society. More specifically, it aims to lift young workers over unprogressive stages of employment by direct preparation for an occupation and to teach definitely in school that which is learned "on the job" in a haphazard way or by chance, if learned at all; it further enables the worker to change to a more congenial occupation, and to advance in whatever occupation he may be pursuing. Satisfaction in work for the worker is one of the goals of vocational education, and this may include such tangible returns for his work as higher wages or income and opportunity for advancement. In wage-earning pursuits vocational education makes possible greater returns for employers in increased output, improved product, and elimination of waste of materials, time, and workers; and benefits society inasmuch as the standards of democracy depend on the worker's interest in his work and the social-mindedness of the people.

Vocational guidance is the attempt of those who are thoroughly familiar with the demands and possibilities of various vocations, on the one hand, and with the capabilities and inclinations of individuals, on the other hand, to assist young persons in their choice of an occupation.

I. VOCATIONAL EDUCATION.

A. Need for vocational education.
   1. Waste in resources and production is caused by unskilled workers.
   2. Trade and commerce are handicapped by industrial inefficiency and waste.
   3. Wage-earning power and satisfaction in work are increased with skill.
   4. Skilled workers and conservation of resources are needed to offset the increased cost of living.
   5. Vocational education provides an opportunity for training for all types of persons, including those already employed. There has been an increasing dissatisfaction with the ordinary school training because it has had little or no connection with vocational needs other than professional.

B. Kinds of vocational education.
   1. Industrial education trains for the mechanical trades and industries.
   2. Commercial education trains not only for stenographic, secretarial, and general clerical positions, but for accounting, selling, business administration, and foreign trade.
   3. Agricultural education trains for farm occupations and farm management.
   4. Home economics education trains for the occupations and the management of the home.

C. Industrial education.
   1. Apprenticeship, the old system of training, declined, due to—
      (*a*) The factory system of production with its machine specialization, by which each worker learns only one small process of an industry.
      (*b*) A growing spirit of independence among young workers, resulting in a rebellion against the restriction of the apprenticeship system.
   2. Evening schools were the first in this country to furnish industrial training, and are widely distributed.

C. Industrial education—Continued.

3. A number of all-day schools for industrial education were established through private benevolence. The New York Trade School for instruction in the building and mechanical trades was a pioneer (1881).
4. Other types of industrial schools have developed as follows:
   (*a*) Public industrial schools supported by State or municipal aid or by a city-school system. These include, among others, trade high schools and high schools with industrial courses.
   (*b*) Apprenticeship schools established by corporations and railroad companies to train their own young workers.
   (*c*) Cooperative industrial schools based on an agreement between the school and the employer whereby the boy or girl alternates school with shop work, the two usually being closely related. These schools are in some instances public.

D. Commercial education.

1. In response to a demand for trained office help private "business schools" were established in all the large cities of the United States between 1830 and 1860. There are now more than 2,000 such schools in the United States (see Federal Board for Vocational Education Bulletin No. 34, p. 9). The fact that these schools are run for profit has resulted, in many instances, in inferior or worthless training.
2. The public schools were slow to introduce commercial training. Within the last 20 years, however, commercial departments have been established in many high schools. Commercial high schools have been opened in a number of large cities.
3. "Business" instruction has for the most part been confined to bookkeeping and stenography. In recent years attempts are being made to fit the instruction to the needs of modern business positions and to broaden the curriculum.
4. One of the most recent developments in commercial education is the movement to teach salesmanship.

E. Agricultural education.

1. Owing to the increasing cost of land more intensive and scientific methods of farming than were customary a generation or two ago are found to be necessary.

E. Agricultural education—Continued.

2. Instruction in agriculture below college grade is comparatively recent.
3. In 1888 Minnesota established the first successful agricultural school of secondary grade in connection with the State Agricultural College. Over half the States have organized similar schools in connection with agricultural colleges. (See U. S. Bureau of Education Bulletin No. 85, 1919, p. 10.)
4. County or district agricultural schools serving the State or a certain portion of it have been established to teach young persons the principles of farming in a dozen or more States. (See U. S. Bureau of Education Bulletin No. 85, 1919, p. 11.)
5. A large number of high schools have agricultural departments or give agricultural courses. The instruction has varied from elementary textbook study covering a few months to a four-year course with practical work, including work either on school land or in a home agricultural project.

F. Home economics education.

1. The custom of teaching household occupations to daughters in the household has been passing with modern conditions of living.
2. The application of science to everyday affairs created a new kind of home making based on scientific knowledge.
3. Instruction in sewing was given in the public schools in Boston in 1876 by authorization of the Massachusetts State Legislature. Instruction in cooking was authorized in 1885.
4. As part of the manual-training movement in the eighties, and of the vocational education movement of the last decade, these subjects have been introduced into the public schools, both elementary and secondary, of most large cities, and instruction has gradually been extended to small towns and villages.
5. Only a small part of home-economics instruction has been on a vocational basis.
   (*a*) It was confined in a large majority of schools to cooking and sewing.
   (*b*) It was given as part of a general education and was allotted a very limited amount of time.
   (*c*) Laboratory methods have been substituted for actual working conditions.

F. Home economics education—Continued.

6. Recent tendencies include the following:
   (*a*) Introducing actual household equipment into the school.
   (*b*) Supplying a real objective for the work, such as preparing food for the school lunch room, preparing lunches for teachers, etc.
   (*c*) Broadening the course to cover budget making, marketing, meal planning, home nursing, care of children, and all phases of home making.

G. Legislation.

1. Prior to 1917 eight States had developed State systems providing State aid for vocational education: Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Indiana, Wisconsin, California. (See Second Annual Report of Federal Board for Vocational Education, 1918, p. 42.)
2. Legislation establishing part-time or continuation schools was enacted in Wisconsin (1911), Massachusetts (1913), and Pennsylvania (1915). These schools provided instruction for employed children over 14 years of age.
3. In 1917 the Smith-Hughes or vocational education act was passed by Congress.
   (*a*) Purpose: To cooperate with the States in promoting vocational education in industry, agriculture, home economics, and commercial pursuits, by financial assistance to the States in paying the salaries of teachers of vocational subjects and in meeting the expenses of training teachers for vocational schools and classes.
   (*b*) General provisions:
      (1) Grants are conditional on Federal approval of State plans.
      (2) States must match Federal funds.
      (3) All instruction must be under public supervision or control.
   (*c*) Provisions applying to schools and classes offering vocational education:
      (1) The controlling purpose must be to fit for useful employment.
      (2) Instruction must be of less than college grade.

G. Legislation—Continued.

3. In 1917 the Smith-Hughes act, etc.—Continued.

(*c*) Provisions, etc.—Continued.

(3) Training must be designed to meet the needs of persons over 14 years of age who have entered on or are about to enter on a vocation.

(4) Teachers must be qualified under standards set up by the State board for vocational education and approved by the Federal Board for Vocational Education.

(*d*) Types of schools and classes organized under the act:

(1) Day or full-time schools in agriculture, home economics, and trade and industry for unemployed young persons over 14 years of age. Interest centers on specific vocations, and science and art and other subjects pursued are related to and reinforce the special vocational lines.

(2) Part-time schools in agriculture, home economics, and trade and industry for employed young persons over 14 years of age. Instruction must be given during the working day and must continue for not less than 144 hours during the school year.

(*a*) Part-time extension, to increase the efficiency of the worker in a vocation already undertaken.

(*b*) Part-time preparatory, to prepare young workers for a vocation other than that in which they are employed.

(*c*) General continuation, to increase the civic and vocational intelligence of the worker. This is the only type of part-time school in which general academic sub-

G. Legislation—Continued.
3. In 1917 the Smith-Hughes act, etc.—Continued.
(*d*) Types of schools and classes, etc.—Continued.
jects may be taught, and is designed for the younger groups with limited general education.
(3) Evening schools, designed for the adult workers who wish to supplement their skill and information in their vocation by short unit courses. In a few States without compulsory part-time legislation, attendance on evening schools for young workers from 14 to 16 years of age has been compulsory. This requirement is disappearing with compulsory part-time laws.

H. Progress in vocational education under the Smith-Hughes Act.
1. State legislation for vocational education.
(*a*) At the close of the fiscal year 1918–19 every State had accepted through legislative act all the provisions of the Smith-Hughes Act.
2. Increased State appropriations.
(*a*) In 40 of the 43 States the legislatures of which met in 1919 appropriations for vocational education were greater than ever before.
3. Increase in trained directors and supervisors.
(*a*) During the fiscal year 1918-19 reimbursement was made in part from Federal funds for the services of 105 State directors and supervisors as compared with 54 in 1917–18.
4. Part-time education laws.
(*a*) Twenty-two States now have public continuation-school laws containing compulsory provisions.
(1) In 18 States the establishment of such schools is compulsory under certain specified conditions, and eligible children are required to attend.
(2) In 3 States the establishment is optional with local school authorities, but when the school has been established eligible children are required to attend.

H. Progress in vocational education, etc.—Continued.
4. Part-time education laws—Continued.
(*a*) Twenty-two States, etc.—Continued.
(3) In 1 State, the establishment is optional with local school authorities and they are authorized to require attendance.

I. Problems of vocational education.
1. To secure a teaching force combining a good general education and ability to teach with vocational knowledge and experience.
2. To reproduce in the classroom conditions approximating those in the vocation studied, that is, to make the instruction practical. Factory shops and machinery, stores, and houses may be utilized to advantage, under public school supervision.
3. In industry to produce a saleable product.
(*a*) The advantages of producing a saleable product are:
(1) To enable the pupil to confront real trade conditions.
(2) To emphasize high standards of workmanship.
(3) To demonstrate the value added to material by labor.
(4) To teach promptness and business methods.
(*b*) On the other hand, certain drawbacks due to the effort to produce a saleable product should be avoided.
(1) The work should not be taken unless it serves the educational needs of the class.
(2) The pupils should not be allowed to repeat processes for the sake of rapid production.
4. To frame a curriculum which will combine practical occupational training with instruction in the broad underlying theory of the vocation in such a way that the student will be trained not only to pursue the vocation, but also to find satisfaction in his work and to become a good citizen.
5. To provide vocational training when it will be of most use—when the person is of an age suitable to enter immediately on a vocation at the completion of training.

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II. VOCATIONAL GUIDANCE, PLACEMENT, AND SUPERVISION.

A. Aims of vocational guidance.

1. To help children under competent supervision to choose, prepare for, and enter occupations suited to their tastes and abilities, and enabling them to give their best service to society.
2. To encourage a more varied program in the schools to the end that each child may obtain in school the training best suited to his needs and capacity for service.
3. To secure better articulation between the work of the school and the life of the community.

B. Need for vocational guidance.

1. For children who go to work at an early age. Many untrained children leave school between 14 and 16 years knowing nothing of occupational life and nothing of their own tastes and aptitudes. They take the first job that is offered, usually one with no future, become dissatisfied, and drift from one occupation to another. Inefficiency, both personal and industrial,

B. Need for vocational guidance—Continued.

1. For children who go to work, etc.—Continued.

and a heavy labor turnover result. The years between 14 and 16 are, therefore, in most cases, worse than wasted in industry. These years are invaluable, however, for guidance and training, and if vocational guidance and vocational education are supplied, children are likely to remain in school longer than they otherwise would.

2. For children who are not compelled to make an early choice. These children may often be aroused to greater interest in their education through some vocational interest.

3. For all children. Vocational guidance helps the individual to realize the duties and responsibilities of a vocation and to understand his relationship to industry and to society as a whole.

C. Principles of vocational guidance. (See Section IV, Outline 6, Topic II.)

1. Vocational guidance should be preceded by educational guidance. The amount and kind of education for each child should be selected, so far as possible, in accordance with his general intelligence and abilities.

2. Vocational guidance should be a part of the school program and should begin before the end of the compulsory school age is reached.

3. The individual child should be studied as to his abilities, characteristics, and tastes.

(*a*) A cumulative school record should be kept, and should be accessible to counselors. It should present not only the academic but also the social and physical and mental history of the child, and should contain an analysis of personal qualities made from time to time by the child's teachers.

(*b*) Intelligence tests should be given by a qualified person to ascertain the child's level of general intelligence. These tests, however, can not always determine a child's special abilities or personal qualities. Temperamental traits, an important factor in the choice of work, can not be gauged by intelligence tests.

(*c*) Opportunity should be given for a wide variety of "try-out experience in academic and es-

C. Principles of vocational guidance—Continued.

3. The individual child, etc.—Continued.

thetic work, gardening, simple processes with tools and machines, elementary commercial experiences, and cooperative pupil activities." (See Principles of Vocational Guidance, Section IV.)

(*d*) Spontaneous interests should be noted by the teacher.

4. Industries and occupations should be studied by the person giving guidance. Vocational guidance by persons with broad and exact knowledge of vocations is desirable, and it is essential that the counselor should know where to obtain such information. Guidance without social perspective is usually worthless and may be dangerous.

(*a*) The amount and kind of education required for success in each kind of work and when and where it may be secured should be ascertained.

(*b*) Opportunities for advancement and manner of advancement (whether through supplementary education, for example) should be learned.

(*c*) Surveys of local occupational openings should be made.

5. Information on the requirements and opportunities of various vocations should be given to the child.

(*a*) Information should be given about commerce, industry, agriculture, and other vocations, in order to help the child in choosing the amount and kind of education best suited to his needs.

(*b*) Information should be given as to kind of training certain schools and courses offer.

(*c*) Information should be given regarding local opportunities for work.

(*d*) Information should be given regarding specific occupations.

(*e*) Information should be given in simple form in economics and in the ethics of vocational life.

6. The choice of occupation should be made by the individual himself.

D. Methods of giving vocational information.

1. Definite attempts in each school subject to show the relation between that subject and occupational problems.

D. Methods of giving vocational information—Continued.

2. Assembly talks on vocations.
3. Publication of pamphlets on occupations which can be easily understood by parents and children.
4. Periodic interviews with the individual child.
5. Surveys by children of local vocational openings, or of occupations into which their friends or former schoolmates have gone and the results. Such surveys are difficult to make in large communities.
6. "Occupational classes" in which vocations are made the subject of study. These classes should study—
   (*a*) The relation of education to the world of work.
   (*b*) General problems of the occupational world.
   (*c*) Specific occupations.
7. Part-time work plans by which the child, while still in school, is enabled to try himself out at practical work. The child's development, and not the needs of industry, should be the first aim in this practice.
8. Trade and commercial tests, consisting of a few weeks experience in trade and commercial schools in various occupations.

E. Placement.

1. All juvenile placement agencies should be coordinated with a central bureau, organized as part of or in cooperation with the school system.
2. The placement bureau should supplement the work of vocational guidance already begun in the school and should work in close cooperation with the school from which the children come, in order that it may—
   (*a*) Give the school an intimate and practical knowledge of the current demands of the occupational world. The placement office is a barometer of industrial conditions.
   (*b*) Assist the school to adapt itself to the needs of the pupils and of the community.
   (*c*) Persuade children, in cases where it seems advisable, to return to school for further education.
3. Job finding should be subordinated to the child's best interests. Not numbers placed, but the right child in the right place should be the aim. Scholarship funds to help needy children to remain in school may be necessary to insure opportunity to all children.

F. Supervision.
   1. Supervision under the direction of the placement bureau, continued after the child has been placed, so that—
      (*a*) If the occupation proves a "misfit" the child may be removed before he becomes discontented or discouraged.
      (*b*) If lack of understanding between employer and child exists, it may be cleared up before the child leaves or is discharged.
      (*c*) The child may be advised in regard to promotion, further training, or advanced study.
   2. Part-time schools, such as continuation schools, trade extension and trade preparatory courses, etc., offer a means of maintaining supervision over the child after he has gone to work. (See Section VI, Outline 5, Topic I, G, 3, *d* (2), and Topic I, H, 4.)

G. Development in the United States of the movement for vocational guidance.
   1. Origin: In April, 1908, a vocational bureau was organized in Boston under Prof. Frank Parsons, who had for some time been interested in helping young immigrants find themselves vocationally. In the early years of its establishment, it was asked to organize the vocational guidance work in the public schools of Boston. It was reorganized in June, 1909, under Dr. Meyer Bloomfield, on a comprehensive plan to aid children and young people of Boston in their choice of occupation and was known as the Boston vocation bureau. In addition to giving vocational advice, the bureau organized summer courses in various universities and training courses in vocational guidance; it arranged for the first National Conference on Vocational Guidance, in Boston in 1910; it published pamphlets and books on trades, commercial occupations and professions; investigated vocational guidance in various countries of Europe and in Porto Rico; organized the Boston Employment Managers' Association in 1911; published many books bearing on kindred problems; carried on investigations; drew up plans for schools and school systems, etc. In 1917 the bureau was taken over by the division of education, Harvard University, as the bureau of vocational guidance.
   2. Work in New York City: The High School Teachers' Association in 1908 began vocational guidance work by making surveys of occupations and holding confer-

G. Development in the United States, etc.—Continued.

2. Work in New York City, etc.—Continued.

ences with graduating pupils. It also prepared pamphlets on vocational subjects and made provision for placement. Voluntary committees under the High School Teachers' Association worked in individual schools. In 1916 a vocational guidance bureau was established by the Henry Street Settlement working through the public schools. In 1920 this bureau was consolidated with the junior employment service of New York, and the Henry Street Settlement Committee for Vocational Scholarships.

3. Work in Chicago: As early as 1910, work had been begun by the Chicago School of Civics and Philanthropy. In 1913, the board of education gave office space and referred all children applying for employment certificates to the placement bureau. Industries in Chicago have been investigated and bulletins published. Follow-up work is done. Early in 1916, the board of education took over the work and established a bureau of vocational guidance.

4. Work in Cincinnati: In 1911 a bureau of vocational guidance financed by private funds was started. Three years later the bureau was organized as a part of the public school system. It consists of three divisions, a department of laboratory research, a certificate issuing office, and a placement office. Mental tests made by the department of laboratory research have resulted in modifying the school curriculum and in the formation of a number of special classes, some for children of inferior intelligence, others for superior children.

5. Other cities developing vocational guidance work: These include Oakland, Calif.; Des Moines, Iowa; Grand Rapids, Mich.; Minneapolis, Minn.; Philadelphia, Pa.; Pittsburgh, Pa., and Providence, R. I.

6. The Junior Division of the United States Employment Service: In December, 1918, a junior section was established in the United States Employment Service, "charged with the guidance and placement of boys and girls under 21 years of age, the designation or appointment of duly qualified counselors, and the provision of suitable methods of organization for the proper counseling of such applicants" (see U. S. Employment

G. Development in the United States, etc.—Continued.

6. The Junior Section, etc.—Continued.

Service, Annual Report of the Director General, 1919, p. 38). During the fiscal year 1920 the junior section had offices in 16 cities, and cooperated with the educational authorities in 8 cities, including New York, Boston, Providence, Cleveland, Milwaukee, and St. Paul. (Idem, 1920, pp. 23 and 24.)

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OUTLINE 6. MINIMUM STANDARDS FOR CHILDREN ENTERING EMPLOYMENT.

The following standards for children entering employment were drawn up at a series of conferences on standards of child welfare called by the Federal Children's Bureau at Washington and a number of other representative cities in May and June, 1919, and attended by child-welfare experts from the United States and many foreign countries. They are intended, as it was pointed out at the time, only as minimum standards and not as in any way limiting the degree of protection which an advanced State might desire to give its children.

Fundamental to the attainment of adequate standards for the protection of children in industry is the possession by the father of the family of an income sufficient to maintain a decent standard of living. Hardly less urgent is the need to improve the schools and to adapt them to present-day needs.

I. AGE MINIMUM.

A. The age minimum for employment in any occupation shall be 16 years, except that children between 14 and 16 may be employed in agriculture and domestic service during vacation periods until schools are continuous throughout the year. (See Section VI, Outline 4, Topics I, A, 1 and II, A, 1.)

B. The age minimum for employment in and about mines and quarries shall be 18 years. (See Section VI, Outline 4, Topics I, A, 2 and II, A, 2.)

C. The age minimum for girls employed as messengers for telegraph and messenger companies shall be 21 years.

D. The age minimum for employment in the special-delivery service of the United States Post Office Department shall be 21 years.

E. The employment of minors in dangerous, unhealthy, or hazardous occupations or at any work which will retard their proper physical or moral development shall be prohibited. (See Section VI, Outline 3, Topics II, A, 6 and II, D, 2; also Outline 4, Topic I, A, 3.)

II. EDUCATIONAL MINIMUM.

A. All children between 7 and 16 years of age shall be required to attend school for at least nine months each year. (See Section VI, Outline 3, Topic II, B; also Outline 4, Topic I, B.)

B. Children between 16 and 18 years of age who have completed the eighth but not the high-school grade and are legally and regularly employed shall be required to attend day continuation schools at least eight hours a week. (See Section VI, Outline 4, Topic I, B, 2.)

C. Children between 16 and 18 years of age who have not completed the eighth grade, or children who have completed the eighth grade and are not regularly employed, shall attend full-time school. Occupational training specially adapted to their needs shall be provided for those children who are unable because of mental subnormality to profit by ordinary school instruction.

D. Vacation schools placing special emphasis on healthful play and leisure time activities shall be provided for all children.

III. PHYSICAL MINIMUM.

(See Section VI, Outline 3, Topic II, A; also Outline 4, Topic I, C.)

A. A child shall not be allowed to go to work until he has had a physical examination by a public-school physician or other medical officer specially appointed for that purpose by the agency charged with the enforcement of the law, and has been found to be of normal development for a child of his age and physically fit for the work at which he is to be employed.

1. A permanent committee of physicians appointed by the United States Children's Bureau to formulate definite standards of normal development and sound health for use of physicians in examining working children has issued a preliminary report. This report covers:
   (*a*) Standards of normal development in boys and girls of specified ages.
   (*b*) Defects for which children should be refused certificates, temporarily or absolutely.
   (*c*) Points to be covered and methods to be employed in physical examinations.

B. There shall be annual physical examinations of all working children who are under 18 years of age.

1. It is generally believed that children are specially liable to injury from overstrain, but practically nothing definite is known of the effects of child labor nor of specific occupations on the growth of the body.
   (*a*) The Children's Bureau committee on physical standards for working children points out the urgent necessity for authoritative scientific investigation in this field.
2. Periodic examination will reveal before it is too late to prevent further injury whether or not a child is physically fit for the occupation in which he is employed.
   (*a*) The committee urges reexamination for children when changing occupations and an examination at least once a year for every working child.

IV. HOURS OF EMPLOYMENT.

A. No minor shall be employed more than eight hours a day or 44 hours a week. The maximum working day for children between 16 and 18 years of age shall be shorter than the legal working day for adults. (See Section VI, Outline 4, Topics I, D and II, D.)

A. No minor shall be employed, etc.—Continued.
   1. In many States, even where younger children are protected, children over 16 years of age are allowed to work ten hours—in some States even longer.
   2. Studies of the relation of fatigue to output have shown that long hours are as little justified by output as by their effect on the health of children.

B. The hours spent at continuation schools by children under 18 years of age shall be counted as part of the working day.

C. Night work for minors shall be prohibited between 6 p. m. and 7 a. m. (See Section VI, Outline 3, Topic II, A, 6; also Outline 4, Topics I, E and II, E.)

V. EMPLOYMENT CERTIFICATES.

(See Section VI, Outline 4, Topics I, F, 1, and II, F, 1.)

A. Provision shall be made for issuing employment certificates to all children entering employment who are under 18 years of age.

B. An employment certificate shall not be issued to the child until the issuing officer has received, approved, and filed the following:
   1. A birth certificate, or, if unobtainable, other reliable documentary proof of the child's age.
   2. Satisfactory evidence that the child has completed the eighth grade.
   3. A certificate of physical fitness signed by a public-school physician or other medical officer specially appointed for that purpose by the agency charged with the enforcement of the law. This certificate shall state that the minor has been thoroughly examined by the physician and that he is physically qualified for the employment contemplated.
   4. Promise of employment.

C. The certificate shall be issued to the employer and shall be returned by the employer to the issuing officer when the child leaves his employment.

D. The school last attended, the compulsory education department, and the continuation schools shall be kept informed by the issuing officers of certificates issued or refused and of unemployed children for whom certificates have been issued.

E. Minors over 18 years of age shall be required to present evidence of age before being permitted to work in occupations in which the entrance ages or hours are specially regulated.

F. Record forms shall be standardized and the issuing of employment certificates shall be under State supervision.

G. Reports shall be made to the factory inspection department of all certificates issued and refused.

VI. COMPULSORY ATTENDANCE LAWS.

A. Full-time attendance officers adequately proportioned to the school population shall be provided in cities, towns, and counties to enforce the school attendance law.

B. The enforcement of school attendance laws by city, town, or county school authorities shall be under State supervision.

VII. FACTORY INSPECTION AND PHYSICAL EXAMINATION OF EMPLOYED MINORS.

(See Section VI, Outline 4, Topics 1, F, 3 and 11, F, 2.)

A. Inspection for the enforcement of all child-labor laws, including those regulating the employment of children in mines or quarries, shall be under one and the same department. The number of inspectors shall be sufficient to insure semiannual inspections of all establishments in which children are employed, and such special inspections and investigations as are necessary to insure the protection of the children.

B. Provisions should be made for a staff of physicians adequate to examine annually all employed children under 18 years of age. (See Section VI, Outline 3, Topic II, A.)

VIII. MINIMUM WAGE.

A. Minors at work shall be paid at a rate of wages which for full-time work shall yield not less than the minimum essential for the "necessary cost of proper living, as determined by a minimum wage commission or other similar official board." During a period of learning they may be rated as learners and paid accordingly. The length of the learning period should be fixed by such commission or other similar official board, on educational principles only.

IX. PLACEMENT AND EMPLOYMENT SUPERVISION.

(See Section VI, Outline 5, Topic II.)

A. There shall be a central agency which shall deal with all juvenile employment problems. Adequate provision shall be made for advising children when they leave school of the employment opportunities open to them, for assisting them in finding suitable work, and providing for them such supervision as may be needed during the first few years of their employment. All agencies working toward these ends shall be coordinated through the central agency.

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CHILDREN IN NEED OF SPECIAL CARE

SECTION VII.—CHILDREN IN NEED OF SPECIAL CARE.

OUTLINE 1. CAUSES AND PREVENTION OF CHILD DEPENDENCY AND NEGLECT.

No amount of individual or social effort can recompense a child for the lack of normal home life in his own family. There is no adequate substitute for parental care and affection. The payment of wages sufficient to maintain a proper standard of living, and the supplying of means of livelihood to families who have lost their breadwinners will do much to eliminate child dependency. Knowledge of the causes of dependency and understanding of community resources is essential to successful work with individual children and general preventive and constructive measures.

I. CAUSES.

A. Lack of normal home.
   1. Death of one or both parents.
   2. Divorce, separation, or desertion.
   3. Illegitimacy.

B. Inadequate family income.
   1. Low wages.
   2. Unemployment.
   3. Sickness or physical disability.
   4. Economic inefficiency due to low mentality, shiftlessness, or bad habits.

C. Parental neglect.
   1. Willful nonsupport or misuse of family income.
   2. Shiftlessness, ignorance, and low mentality.
   3. Alcoholism, immorality, or other delinquency.

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II. PREVENTION.

A. Supplying means of livelihood to families whose breadwinners are absent or incapacitated.
   1. Workmen's compensation for accident or sickness.
   2. Allowances and compensation for soldiers' and sailors' families.
   3. Mothers' pensions.
   4. Family relief from public or private agencies.

B. Adequate family incomes.
   1. Wages sufficient to supply the necessities of life.
   2. Regularity of employment and unemployment insurance.

C. Enforcement of parental responsibility and prevention of neglect.
   1. Through nonsupport and desertion laws.
   2. Through enforcement of support of children of illegitimate birth.
   3. Supervision by courts or other social agencies of families failing to provide proper home conditions.
   4. Community measures for improved social and moral conditions, including prevention of alcoholism, immorality, and crime.

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OUTLINE 2. CAUSES AND PREVENTION OF JUVENILE DELINQUENCY.

Juvenile delinquency results most often from adverse environmental conditions, or from a defective physical or mental constitution. The remedy lies chiefly in the improvement of family and community standards and the scientific treatment of physical and mental defects and disabilities.

I. CAUSES.

A. Environmental.

1. Lack of proper home conditions and parental supervision, due to inadequate income, employment of mother, poor housing conditions and overcrowding.
2. Parental neglect due to ignorance, shiftlessness, alcoholism, immorality, or other delinquency.
3. Bad neighborhood conditions; bad companions; degrading influences.

B. Physical and mental.
   1. The physical bases of delinquency.
   2. The effect of adolescent instability, mental conflicts, or neurotic tendencies on conduct.
   3. Mental defect and delinquency.

C. Premature employment or employment under morally detrimental conditions.

D. The spirit of adventure and the lack of opportunity for wholesome recreation.

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II. PREVENTION.

A. Maintenance and improvement of family standards.
   1. Adequate family incomes.
   2. Improved housing conditions.
   3. Prevention of neglect.

B. Community and civic betterment.
   1. Elimination of bad conditions in the community, such as vice and drunkenness.
   2. Protective work on the part of police and other agencies—"curfew ordinances," breaking up of gangs, supervision of places of amusement, work with individual children.
   3. Provision of facilities for wholesome recreation, including parks and playgrounds, community centers, boys' and girls' clubs.

C. Provision for discovery and treatment of physical and mental abnormalities and defects.
   1. Medical inspection of school children and clinics for examination and treatment.

C. Provision for discovery, etc.—Continued.
   2. Psychopathic clinics in connection with juvenile courts.
   3. Provision for special care of mentally defective children with delinquent tendencies.

D. Enforcement of compulsory education laws and child labor laws. Prohibition of premature labor, or child labor under detrimental conditions.

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OUTLINE 3. THE CARE OF DEPENDENT, NEGLECTED, AND DELINQUENT CHILDREN.

For children who must be provided for outside their own homes, as close an approximation as possible to normal home life and parental care is necessary. Essential to a right solution of the difficult problems involved is a thorough knowledge of the family background and the child's history and characteristics. Treatment must be adapted to individual needs. The child's physical, mental, and moral development must be safeguarded, and normal outlets for his natural instincts provided.

That a delinquent child shall not be deemed a criminal but a child in need of the protection of the State is the fundamental principle in modern juvenile court legislation. Parental responsibility for the child's conduct is emphasized, and whenever possible the child is allowed to remain in his own home, under the supervision of a probation officer. Training schools and reformatories exist, not to inflict punishment, but to give the child advantages in the way of physical training, education, preparation for industry, and training in self-control and self-government.

I. METHODS OF CARE OF DEPENDENT AND NEGLECTED CHILDREN.

A. Types of provision.
   1. Placing in family homes; free; boarding; for wages.
   2. Adoption.
   3. Institutional care; temporary; prolonged.

B. Systems of care.

1. Direct care by State boards or departments through placing in family homes, institutional care, or both. (For illustration of placing-out: Massachusetts, New Jersey, District of Columbia; State public schools: Michigan, Minnesota, Wisconsin, Colorado; State orphans' homes: Kansas, Iowa, Illinois, Maine, Pennsylvania, Indiana.)
2. Supervision by State boards over agencies and institutions caring for children; inspection and licensing of homes in which children are placed; investigation of adoptions.
3. County and municipal care of children.
4. Semipublic institutions and agencies: Subsidized by State or local governments; per capita payments from State or local governments.
5. Private child-caring societies: Children's aid societies; home-finding societies; societies for prevention of cruelty to children; other societies placing children in family homes or for adoption, or supervising them in their own homes.
6. Orphanages, schools, and homes for dependent and neglected children: Types—congregate; cottage.

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II. JUVENILE COURTS.

A. History of the juvenile-court movement.
B. Jurisdiction—delinquent children; dependent and neglected children; adults involved in children's cases; mothers' pensions.
C. Organization.
D. Fundamental principles.
   1. Child not treated as a criminal.
   2. Privacy of hearings: Children's cases heard in special room or special session.
   3. Separate place of detention provided for children.
   4. Adults held responsible for contributing to juvenile delinquency.
   5. Adequate knowledge in regard to each child through mental and physical examination and social investigation.
   6. Probation.

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III. REFORMATIVE TREATMENT.

A. The probation system (the supervision in their own homes of children who have been adjudged delinquent).
B. Training schools and reformatories.
   1. Types: Training schools and reformatories for boys, institutions for delinquent girls—cottage and congregate; industrial, agricultural, others; self-governing, partially self-governing, nonself-governing.
   2. Modern principles: Absence of prison features; encouragement of self-control; modern educational methods; physical training; industrial and agricultural training.

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OUTLINE 4. CHILDREN HANDICAPPED PHYSICALLY OR MENTALLY.

The physically handicapped child presents problems of medical care and treatment, and of education and employment. Specialized training may in many instances enable the individual to become a useful and self-supporting member of society. The work being done in connection with the vocational rehabilitation of persons disabled in industry and the work with the disabled soldiers will lend stimulus to all efforts of this kind.

Mentally defective children present urgent needs. Never attaining a mental development above that of a child of 12 years, mentally defective individuals require supervision and guidance throughout life, while the lowest grades require constant physical care. The frequent coincidence of mental defect and lack of self-control, or tendencies toward vicious or delinquent conduct make the unprotected feeble-minded a serious menace to society. Institutional facilities are nowhere adequate for the accommodation of all who are

in need of care. The possibilities of supervision in the community for certain types of mental defectives are only beginning to be recognized.

I. THE PHYSICALLY HANDICAPPED.

A. Classes.
   1. The blind.
   2. The deaf and dumb.
   3. The crippled.
   4. The tubercular and anemic.

B. Treatment.
   1. Correction of remediable defects and disabilities through hospital treatment, clinics, and dispensaries.
   2. Education (including sense training and industrial training) adapted to special needs; special classes in public schools; special day schools; institutions.
   3. Industrial opportunities.

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II. THE MENTALLY DEFECTIVE.

A. Causes of mental defect.

B. Types.
   1. The low grade: Untrainable; in need of constant physical care.

B. Types—Continued.

2. The higher grade: In need of training and supervision.
3. Those with delinquent and vicious tendencies: In need of close supervision or institutional care.

C. Treatment.

1. Clinics for mental examination and diagnosis.
2. Supervision in the community and training in special classes or special day schools—for those whose home conditions are favorable, and who have not exhibited delinquent tendencies.
3. Institutional training—for those who can not be provided for in the community, but who may be able to go out under supervision after a period of training and discipline.
4. Permanent custodial care for dependent and delinquent mental defectives.

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OUTLINE 5. COMMUNITY ORGANIZATION FOR CHILD-HELPING WORK.

Child-helping work has been handicapped by lack of coordination and cooperation. This has resulted in duplication of effort, neglect of certain fields, and an absence of common ideals and standards. The revision of children's laws which has already been undertaken in half the States is a first step in the direction of organizing and unifying child-helping work. Attempts at definition of the scope of public and private effort have been made, and the need for State supervision of local and private agencies is becoming more widely recognized.

I. GENERAL.

A. National.

1. Federal Government: The United States Department of Labor, through the social service division of the Children's Bureau, investigates and reports on problems concerning dependent, defective, and delinquent children; agencies; institutions; juvenile courts; etc.
2. Private nation-wide organizations: Purpose—investigation, publicity, education, standardization, and coordination of local effort.

B. State and local.

1. Functions of public organizations.
   - (*a*) Supervision and standardization of work of agencies and institutions.
   - (*b*) Administrative—providing care for the delinquent, the mentally or physically defective or diseased, and dependent children in need of prolonged care; supervision and care of children in own homes.
   - (*c*) Judicial—adjudication of questions involving relations of parent and child, and child and community.
2. Private organizations.
   - (*a*) For preventive work—constructive work with families; child protective work; recreational activities.
   - (*b*) Child-caring agencies and institutions.

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II. CHILD-HELPING WORK OF THE STATE AND OF THE COMMUNITY IN WHICH THIS COURSE IS GIVEN.

A. Study of work of State boards or bureaus concerned with the care of dependent, delinquent, and defective children; organization, powers, and duties. (See Section VII, Outline 5, Topic I, B, 1.)

B. Description of State agencies and institutions dealing with children in need of special care: scope of work; methods; types of institutions; care given.

C. Description of local organizations doing constructive and preventive work. (See Section VII, Outline 5, Topic I, B, 2.)

D. Description of private child-caring agencies and institutions.

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Annual report.

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Bulletin No. 13. (Agricultural Series, No. 1.) Agricultural Education—Organization and Administration.

Bulletin No. 15. (Reeducation Series, No. 3.) The Evolution of National Systems of Vocational Reeducation for Disabled Soldiers and Sailors.

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